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ABSTRACT

Population growth around the world affects Americans through its impact on economy, environment, safety, and health, and the condition of the world children will inherit. The cumulative evidence is strong that current rates of population growth pose significant and interacting risks to human well-being and are a legitimate concern for Americans. The demographic case is presented for U.S. assistance to programs that help slow population growth in developing countries. Furthermore lower rates of population growth would contribute significantly to improving people's lives. The population, which numbers about 5.8 billion people, grows by nearly 90 million people each year, and it is not physically possible for population growth to continue long at today's levels. Sixteen key reasons for slowing population growth are described under the general headings of economic development, the environment, and safety and health. "Education" is key reason number 5 (pages 23-24) under the heading of Economic Development. The U.S. government currently provides its population assistance through bilateral, nongovernmental, and multilateral channels, but growth in U.S. funding for family planning and other reproductive health services has not kept pace with demand. The 30-year U.S. effort to make contraception and related health services available worldwide is threatened by misunderstandings and misinformation. An attachment explains how to write effective letters to legislators in support of population programs. (Contains 17 graphs, 2 tables, 2 figures, and 15 references.) (SLD)

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POPULATION MATTERS

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WHY POPULATION MATTERS

1996

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why this publication

Population growth around the world affects Americans through its impact on the economy, the environment, safety and health, and the habitability of the world children will inherit. Analysts have long disagreed about the precise impacts of population growth, which is not surprising, given the difficulty of tracing cause and effect in human affairs. This publication argues that the cumulative evidence is strong that current rates of population growth pose significant and interacting risks to human well-being and are a legitimate concern for Americans.

The purpose here is to state the demographic case—succinctly and based as much as possible on the research in this field—for U.S. assistance to programs that help slow population growth in developing countries. This demographic case—that lower rates of population growth would contribute significantly to improving people's lives—does not by any means provide the only reason to support these population programs. Family planning and related health services, expanded education for girls, and increased economic opportunities for women also directly improve the lives of women and families. However, at a time when U.S. international involvement is increasingly under question, it is important to clarify all the reasons it is in our interest to support international population and family planning programs.

Evidence is strong that current rates of population growth pose significant and interacting risks to human well-being.

These programs work to slow population growth chiefly by improving and making more widely available safe and effective family planning services that enable couples and individuals to have children when they choose. Without these programs, the pace of population growth could not have fallen as rapidly as it has since 1970. Most of the funding for the programs comes from the countries where the services are delivered. Under the U.S. aid program the cost to U.S. taxpayers has averaged around $500 million per year in recent years, or two dollars per American. While the United States has been a pioneer in support for the delivery of family planning services worldwide, the recognition is widespread here and abroad that other social strategies contribute as well to slower population growth. The two most important such strategies are greater access to education for girls and better economic opportunities for women.

THE REALITIES OF POPULATION ASSISTANCE

Since the 1930s, surveys have consistently demonstrated that from 60 to 85 percent of Americans believe contraception should be available to those who want to plan their families. Recent polls indicate as well that most Americans support U.S. efforts to expand access to family planning abroad. For the most part, Americans have a sense of fairness about this issue and feel that people in poorer countries should have the same capacity as Americans to have children only when they choose to. Yet surveys and focus groups also indicate that many Americans associate "population policies" with culturally suspect messages to "stop having so many children." The perception appears to be widespread that few people in developing countries want access to birth control and that most overseas population programs are coercive. In recent years, misunderstanding about the relationship between family planning and abortion has further undermined political support for the 30-year U.S. effort to help developing countries provide safe, voluntary family planning services.

The reality differs greatly from the popular perception. In developing countries, more than half of all married women practice family planning and nearly half use modern contraceptive methods.[1] One-quarter to one-half of women in developing countries report that their last birth was either unwanted or mistimed, and both average family size and the number of children women report they want have been falling rapidly. Most women surveyed report that they do not want to have any more children or they do not want to have a child soon. Unfortunately, an estimated 120 million women who do not want to become pregnant currently have no access or inadequate access to safe and effective contraception.[2]

An estimated 120 million women who do not want to become pregnant currently have no access or inadequate access to safe and effective contraception.

The family planning programs to which the United States contributes reach people directly and help them improve their own lives while also slowing population growth. These programs offer much needed alternatives to abortion by providing a range of contraceptive choices to couples and individuals who seek this help. And the programs offer the information and counseling needed to postpone or avoid pregnancy without undue risk to health. In its population assistance program, the U.S. Agency for International Development supplies only those contraceptive methods approved for use in the United States. U.S. tax dollars do not support any government, agency or program that coerces people or offers them incentives to have fewer children.

Under a law enacted in 1973, no U.S. funding for family planning and related health services pays for abortions. Although the terms family planning, contraception and abortion are often confused, those who work in the field of reproductive health and family planning consider abortion to be the result of a family planning failure. For whatever reason—a lack of contraceptive options or contraceptive failure—an unwanted pregnancy has occurred. Evidence from Eastern Europe suggests that abortion rates tend to be highest when and where contraceptive services are least available.[3] Indeed, after a widely publicized medical study

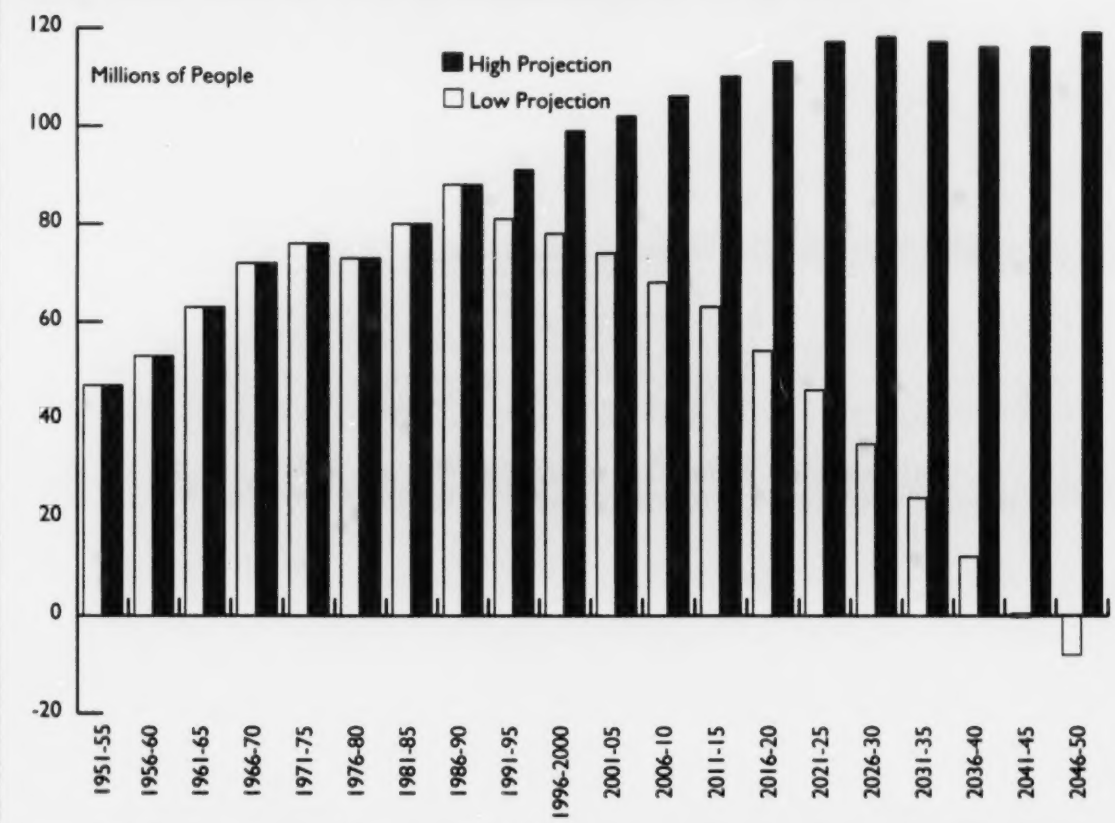
raised questions about a particular brand of birth control pills in Britain in October 1995, prompting many women to stop taking the pills, abortion rates in the country rose nearly 10 percent over the next three months, doubling in at least one metropolitan area.[4] Since unsafe abortion is responsible for an estimated 13 percent of the 585,000 annual deaths associated with pregnancy and childbirth, providing effective and safe contraceptive alternatives saves women's lives.[5]

Most Americans support U.S. efforts to expand access to family planning abroad.

Family planning programs have assured life and health to millions of women and their families in other ways as well. Births that are too closely spaced or occur when women are too young or too old pose serious risks to the health and survival of mothers. Closely spaced pregnancies (less than two years apart) can raise the risk of death for both mothers and their children, especially where health and nutrition are poor. Research in Bangladesh has shown that when mothers die in childbirth, their babies rarely survive to the age of one year.[6]

In addition to providing powerful health benefits and alternatives to abortion, the spread of family planning may have contributed as much as economic and all

Yearly Additions to World Population from 1950 to 2050



Yearly additions to world population may be peaking now, or could climb well into the 21st century.

Data: United Nations Population Division

other factors combined to the decline in birth rates in developing countries since 1970.[7] Not only do women who practice family planning tend to have fewer children, but delaying first pregnancies and spacing subsequent births through family planning slow the pace of population growth by stretching out the time between generations.[8]

U.S. leadership in family planning assistance has encouraged other countries and international agencies to contribute to family planning programs in developing countries. U.S. technical and financial assistance has helped strengthen the commitment of governments of less developed countries to make family planning and related health services available to their citizens. Today, after more than three decades of international cooperation, almost every developing country has a government-sponsored program providing at least some family planning services. The money contributed by the United States and other donor countries provides only about 25 cents out of every dollar spent on these services in developing countries. The other 75 cents comes from the governments of the countries involved and from consumers.[9]

POPULATION GROWTH: INTERACTING IMPACTS IN THE 21ST CENTURY

Two points on the interaction of population dynamics and human well-being stand out. Population growth may have different impacts depending on when, where and how it occurs—through decreases in death rates, increases in birth rates, or increases in immigration. The impacts depend not just on the rate of growth but on the size and age structure of the existing population, the relationship between this population and such natural resources as water and cropland, and the adaptability of the societies in which population growth is occurring. Where natural resources are abundant and population density is low—as was the case with the United States in the 19th century—population growth can be a dynamic force that spurs technological innovation, industrial development and new political and social institutions. Where megacities approach unprecedented population sizes of 15 million or 20 million while plummeting water tables threaten the stability of buildings—as is the case currently with Mexico City—the impact of additional population growth may be far more severe. The arguments presented here do not describe unchanging demographic laws but rather the best available assessments of the consequences of population growth at the end of the 20th century. And they apply especially to developing countries, which are least capable of adjusting to rapid changes in population size and distribution.

The money contributed by the United States and other donor countries provides only about 25 cents out of every dollar spent on family planning services in developing countries.

The second point is that population growth influences many areas of human affairs. The issue is not merely food security or health or environmental quality or economic growth, but all this and more. All human beings, for example, influence the natural environment, although these influences may differ by region, culture,

income level and individual. By increasing the scale of human activities, population growth amplifies these impacts, potentially to the point that they exceed the resilience of natural systems. Population growth encourages, for example, the release of greenhouse gases, which is contributing to global climate change, which could alter habitats and cause the loss of plant and animal species that humans may depend on for food, medicine or pest control. Because its impacts are so widespread across so many issue areas, slowing population growth would produce a range of mutually reinforcing benefits—a point sometimes lost when weighing population policies against alternatives in specific issue areas.

The evidence presented here argues for prudent efforts that will contribute to a stable world population within at least the lifetimes of our children.

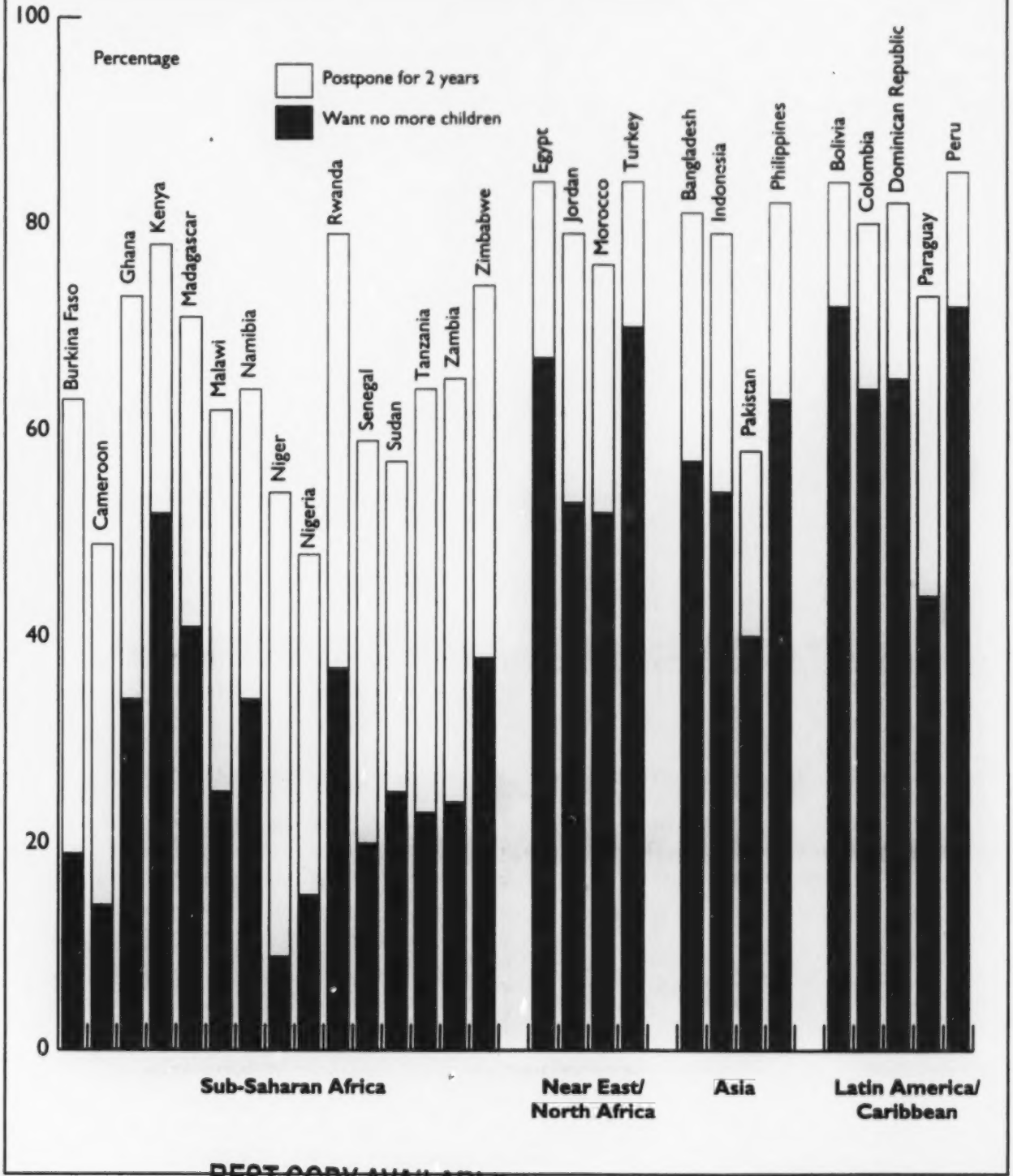
In our lifetimes, humanity has become a force on the planet that rivals nature. The reasons for this are complex and linked to changes not only in human population but in technology, consumption patterns, unequal distribution of wealth and the choices made by people, businesses and governments. Research on these issues is far from complete. At some point, however, the cumulative weight of the evidence presented here argues for prudent efforts that will contribute to a stable world population within at least the lifetimes of our children. The need is not to control population growth. Governments cannot control childbearing and attempts to do so have sometimes led to coercive approaches to reproduction that violate human rights. The need is rather to expand the power individuals have over their own lives, especially by enabling them to choose how many children to have and when to have them.

This may seem paradoxical to those who associate the term population policies with the idea of urging people to have fewer children for the sake of future population size. Rather, because women and men already want to have fewer children, they will do so when they can put into effect their own choices on childbearing safely and affordably. In wealthy countries like the United States and Japan, well over 80 percent of women say they want to discontinue or at least postpone childbearing. In Asia, Latin America and even in sub-Saharan Africa, the percentage reporting this conviction tends to be lower, but it is still consistently over 50 percent.[10]

This is not to say that there is no role for policies and programs that result in further reductions in the number of children women want to have. Women with several years of schooling, for example, tend to delay motherhood and give birth to fewer children.[11] This also appears to be true of women who earn income.[12] Access to family planning and related health services and access to education and income producing opportunities for women are thus mutually supportive. Together, such efforts could result in a stable world population at levels only somewhat higher than today's before the middle of the next century. In combination with ambitious efforts to manage the planet's natural resource base and to improve social and economic justice, population stabilization could help bring about a global society that remains dynamic, yet confident and secure about its long-term future.

Population change and its impact on our world are neither too overpowering nor too controversial for us to address. Population growth results from the collective actions of billions of human beings. Our overall impact is determined not only by our numbers but by our behavior. Each of us can make a difference, not only by

Women Who Want No More Children or Wish to Wait for Two Years, Selected Countries



Data: Demographic & Health Surveys

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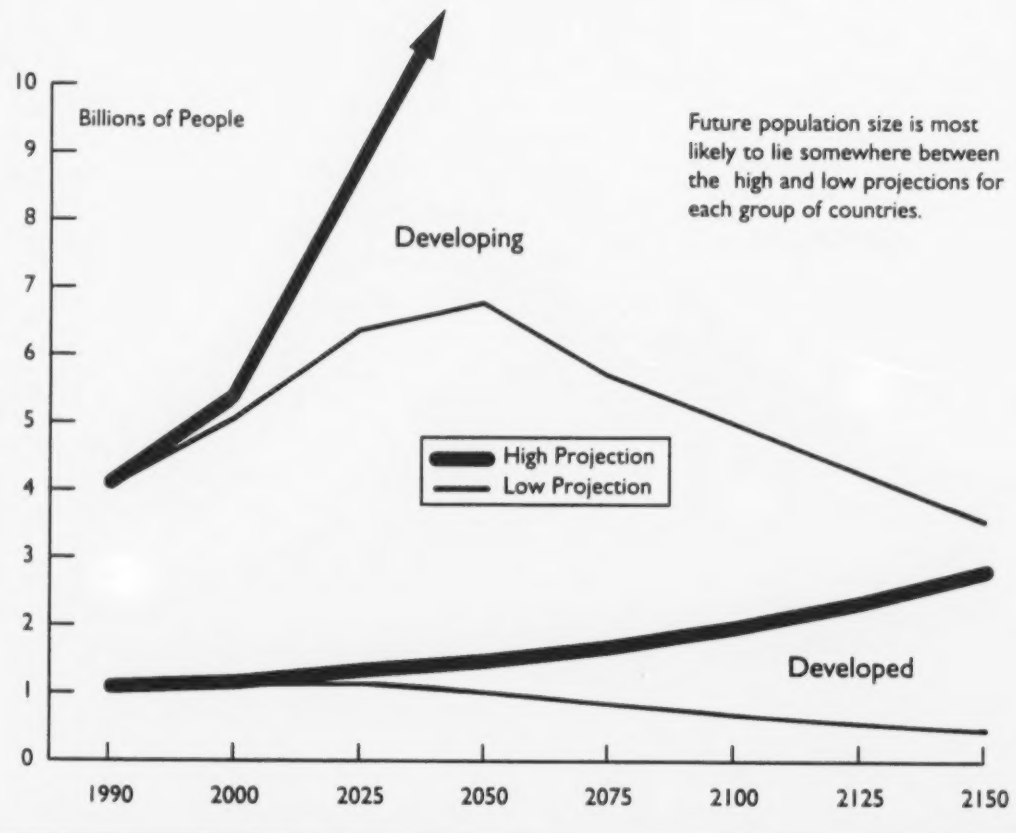
The need is to expand the power individuals have over their own lives.

the decisions we make for our own lives but through the conditions we help create for others to make choices freely. We can support more public discussion of population issues and speak or write about the need for family planning and related health services to news media, to our representatives in Congress and to the President.

Americans have a long tradition of offering a helping hand to those in need both at home and abroad. Making sure that individuals and couples who want to plan their families can do so is one of the most important ways to help others, which in turn helps make the world more secure for us all.

Projected Population of Developed & Developing Countries



Data: United Nations Population Division

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4. "British Abortions Up After Pill Scare—Survey," Reuters wire service release, 14 April 1996.

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12. Sidney Ruth Schuler and Syed M. Hashemi, "Credit Programs, Women's Empowerment, and Contraceptive Use in Rural Bangladesh," *Studies in Family Planning*, vol. 25, no. 2 (March-April 1994); Sidney R. Schuler, "Empowerment and Family Planning in Bangladesh," *Network*, vol. 15, no. 1 (August 1994).

SOME POPULATION FACTS AND FIGURES:

The world's human population currently numbers about 5.8 billion people, and the figure grows by nearly 90 million people each year, or around 240,000 each day.[1] This annual addition to population is historically unprecedented. It stems in large part from the size of current population. The growth rate itself has actually declined since 1970, from about 2 percent to about 1.5 percent today. However, because this rate is applied to a much larger population than in 1970—when world population stood at 3.7 billion people—the added yearly increments are larger. If the population growth rate does not fall further, world population will double by the year 2040.[2]

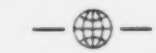
It took all of history up to the early 1800s for world population to reach 1 billion people, and until 1960 to reach 3 billion. Today, the world gains 1 billion people every 11 years.[3]

Population in most industrialized countries continues to grow through either natural increase (resulting from more births in a country than deaths) or immigration, or both. In the United States, natural increase is about 0.6 percent a year, while total population growth is around 1 percent. Nonetheless, more than 90 percent of the world's population growth is occurring in developing countries in Asia, Africa and Latin America. The rates of natural increase on these continents vary, however, from 1.6 percent in Asia and 1.9 percent in Latin America and the Caribbean to 2.8 percent in Africa.[4]

While Asia's population growth rate is lower than those of Latin America and Africa, the vast continent has three-fifths of the world's people and thus adds more people to world population than any other continent. Population density is also greatest in Asia, with more than 282 persons per square mile. This compares with 60 persons per square mile in Latin America and the Caribbean, 62 persons per square mile in Africa, and 73 persons per square mile in the United States.[5] Comparisons of population density can be misleading, however, since the natural resources on which human life depends—fresh water, farmland and forests, for example—are unevenly distributed across islands and continents.

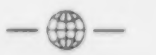
It is not physically possible for population growth to continue for long at today's levels. The current size of human population, and the additions made to it each year, are unprecedented in history. There is also the sheer power of continuing exponential growth to consider. One demographer calculated in 1974 that at then-current growth rates, in seven centuries only one square foot of land would be available for each human being. Within 6,000 years, the mass of humanity would form a sphere expanding outward from the earth at the speed of light.[6] Population growth rates have declined since the publication of these calculations, but the point remains. Growth rates similar to those of today cannot continue indefinitely.

The power of exponential growth is sometimes illustrated by the story of a pond lily that doubles its extent every day. If it takes the lily a year to fill the pond, it takes a full 364 days to fill half the pond. Only on the last day of the lily's expansion are the limits obvious. Human beings, of course, are not lilies. Nonetheless, we, too, need water, air and nutrients to survive, and the planet's supply of all of these is finite. Within a century or two—a blink of an eye in humanity's time on earth—population growth will decline significantly from current rates or end altogether. Today's rapid population growth is thus a relatively brief interlude in humanity's experience. The biggest question is whether this growth will slow or end due to decreases in birth rates or increases in death rates, or both. In the words of population scientist Joel E. Cohen, "The finiteness of the Earth guarantees that there are ceilings on human numbers."[3]

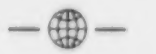


Even if a considerably larger population than today's could live safely and sustainably in balance with the earth's resources, population momentum would remain a concern. Population momentum is the tendency of any population with a high proportion of young people to continue growing for some time even after women begin having two children each, on average. (This is called "replacement fertility," because each couple replaces themselves numerically in the population.) When there are many people of childbearing age and relatively fewer old people near the end of their lives, even two-child families on average will produce births well in excess of deaths, and this will be true until roughly equal numbers of people are in each age group. The colossal momentum of population growth has been compared to the long stopping distance of a large, fully loaded truck. Because of past population growth, an unusually high proportion of today's world population consists of young people just entering their childbearing years. This contributes to the substantial population momentum that is a critical demographic factor today and will be for some time. Demographers project that if women began having just two children on average today, population would still grow from today's 5.8 billion to more than 8 billion before stabilizing in the next century.

The power of population momentum, along with other drivers of population growth, multiplies the physical momentum embedded in two of the most worrisome environmental trends. In the case of climate change, global temperatures are likely to continue climbing for decades even after concentrations of heat-trapping greenhouse gases reach stable levels in the atmosphere. This is because the oceans store vast amounts of heat in their depths, which delays the greenhouse warming experienced at the earth's surface. In the case of the extinction of plant and animal species, the populations of some of these species may be past reviving due to current loss of habitat or overharvesting by humans, even though individuals of the species may linger for several more generations. The future growth of human numbers, some of it from population momentum, adds to the pressures that build momentum into climate change and the ongoing loss of biological diversity.



Population momentum can be eased significantly by policies that encourage women to delay childbearing, as this stretches out the time between generations. By one estimate, the total population of developing countries could stabilize with 1.2 billion fewer people than would otherwise be the case, if the average age of childbearing were delayed in these countries by five years.[4] In many countries women have fewer than two children each on average, which helps slow population growth. Nonetheless, societies and nations will not have the luxury of halting population growth at whatever point in the future they decide it presents serious problems. The process of stabilizing population will almost certainly take decades.



Since 1960, a revolution in childbearing has occurred, and this revolution underlies the global slowdown in population growth. Women gave birth to more than five children on average 36 years ago. Today, around the world women on average give birth to three children—fewer than ever before in human history. In order to stabilize world population while maintaining low death rates, average births will need to total about two children per woman. There is strong evidence that the average fertility rate in developing countries of 3.4 children would fall at least half way to this critical level if all unintended pregnancies could be avoided.[9] Average fertility rates are already at or below two in almost all industrialized countries, although even in some of these countries (notably the United States) high proportions of pregnancies are unintended. In high-fertility countries in sub-Saharan Africa, where women often report a preference for large families or "all the children God sends," between 36 and 55 percent of women report that their most recent birth was mistimed or unwanted.[10] In India, average family size has fallen from 5.3 children per woman in 1970 to 3.6 children per woman in 1992.[11] In Vietnam, where the average number of children per woman has dropped from almost 4 in the early 1990s to 3 today, the average desired by just married women is 2.3.[12]

The use of contraception in developing countries has grown by a factor of 10 or more since the 1960s,[13] indicating that for hundreds of millions of couples and women, family planning serves a critical human need. In developing countries outside of China, almost 250 million women[14]—a number almost as large as the entire population of the United States—use modern methods of contraception, indicating how popular family planning has become in the last few decades. An estimated 120 million women would like to avoid pregnancy but are not using any form of contraception. Many more women are undoubtedly using contraceptives irregularly or inappropriately because they have too little contraceptive information and method choice.

Despite the slowdown in world population growth rates, the number of couples and women who are in their childbearing years is growing rapidly today. This is the population directly served by family planning. Meeting the needs of this population—or just staying even with the growth in demand—will take a major global effort. The number of women in their childbearing years in developing countries is now growing by about 24 million each year.[15] While world population as a whole is growing at 1.5 percent annually, this population—women in developing countries between the ages of 15 and 49—is now growing much faster, at about 2.3 percent annually. This is equivalent to a nation the size of Peru being added each year to the numbers of women in their childbearing years. Even if governments put no further effort into expanding the reach of family planning services, they would have to increase their spending by well over 2 percent annually, not including inflation, just to keep the proportion of women served by family planning from falling.

Based on the recent history of fertility and population growth, the challenge is not to reverse the dominant population trends but to accelerate them. If current trends in population growth, desired family size, fertility and family planning use are encouraged and supported, world population might not double by the middle of the 21st century—or ever. Population growth has not slowed down by happenstance, however. It has slowed because more couples and women than ever before want to plan their families—and because governments, private organizations and dedicated individuals are struggling to provide the knowledge and means to plan families effectively, with sound information, a range of choices and a reasonable assurance of health for women and their children.

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3. United Nations and Population Reference Bureau data sets.

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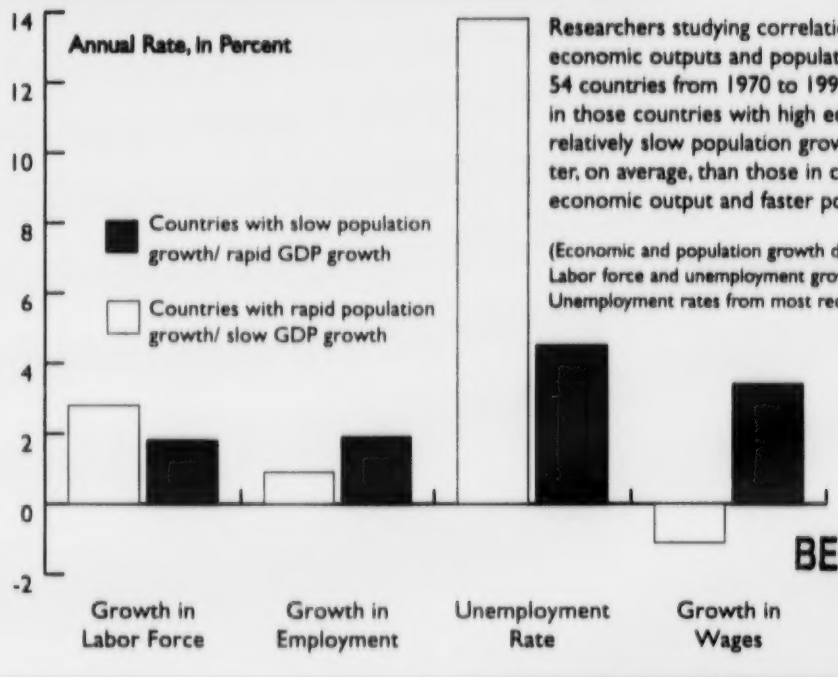
economic growth and world trade

Slowing population growth will help poorer countries develop economically, enhancing their ability to participate in world trade. This can only benefit the U.S. economy, which is the world's largest.

While the influence of population growth on economic development is controversial, the weight of scholarly opinion today supports the view that the poorest countries would be more likely to achieve reasonable growth rates in per capita income if their rates of population growth fell through declines in birth rates.[1] The connection between economic and population growth is often confused by a chicken-and-egg dilemma: Economic growth often leads to declines in death rates and increases in immigration, both of which contribute to population growth, so it can sometimes appear that economic and population growth go hand in hand. When the discussion is narrowed to the rela-

Labor-Related Indicators Compared by Relative Growth Rates in Population and Gross Domestic Product (GDP)



Researchers studying correlations among labor and economic outputs and population growth rates in 54 countries from 1970 to 1992 found that workers in those countries with high economic output and relatively slow population growth fared much better, on average, than those in countries with lower economic output and faster population growth.

(Economic and population growth data from 1970 to 1992. Labor force and unemployment growth from 1980 to 1991. Unemployment rates from most recent year available.)

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Data: World Bank and International Labour Organization.

tionship between birth rates and per capita income change, the negative influence of high fertility on income is more apparent.[2] When each generation is similar in size to the one that precedes it, parents find it easier to prepare their children for productive lives. Governments find it easier to build and maintain transportation infrastructure and provide such social services as universal schooling. These lay the groundwork for investment and economic growth.

It is possible, of course, that rapid population growth may contribute to economic growth at certain times and yet constrain it at others. In societies fortunate enough to begin the development process with small populations and abundant natural resources, rapid population growth may indeed help spur economic development. But in most developing countries today populations are already large relative to the availability of natural resources, and supplies of renewable fresh water and farmland are scarce and often concentrated in a few hands. Under such circumstances, further rapid population growth is especially likely to contribute to soil erosion, declines in water quantity and quality, and the partition of farmland into parcels too small to support families. These trends can undermine both subsistence farming and cash crop production and hinder both economic growth and industrial development, which historically have been built upon strong agricultural economies.[3]

Governments must grapple with the problems of resource scarcity and inequality, while also devoting disproportionate energy and resources to the challenge of educating and providing jobs for ever-growing generations of young people.

Lending support to the evolutionary relationship between population and economic growth, a recent review of the evidence suggests that the association between high birth rates and slowed income growth was weak in the 1960s and 1970s but strengthened significantly in the 1980s, especially in the poorest countries.[4]

In theory, more people may mean a country can produce and consume more goods and services, leading to economic growth. But this can only occur when employment opportunities grow at least as fast as the labor force and when people have access to the necessary education and training. This is a race that many governments are losing. Rapid population growth complicates the task of providing and maintaining the infrastructure, education and health care needed by modern economies.

"The balance of present scholarly judgment," writes population scientist Joel E. Cohen, "is that slower population growth would benefit most developing countries, and that rapid population growth exacerbates many other problems of which it is not the sole or principal cause."[5]

Trade is now a global activity, and much of the future growth of the U.S. economy will depend on the capacity of people in countries around the world to buy U.S. products. Boosting U.S. exports stimulates the growth of jobs that pay, on average, wages that are 13 percent above average.[6] Moreover, the most dynamic growth in demand for U.S. export products is occurring in developing countries. The expansion of this demand can be eroded by rapid population growth.

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1. Allen C. Kelley and Robert N. Schmidt, "Aggregate Population and Economic Growth Correlations: The Role of the Components of Demographic Change," *Demography*, vol. 32, no. 4 (November 1995); Joel E. Cohen, *How Many People Can the Earth Support?* (New York: W.W. Norton, 1995).

2. Ansley J. Coale, "Population Trends and Economic Development," in Jane Menken, ed., *World Population and U.S. Policy* (New York: Norton, 1986).

3. Kevin M. Cleaver and Götz A. Schreiber, *Reversing the Spiral: The Population, Agriculture, and Environmental Nexus in Sub-Saharan Africa* (Washington, D.C.: The World Bank, 1994).

4. Kelley and Schmidt, "Aggregate Population and Economic Growth Correlations."

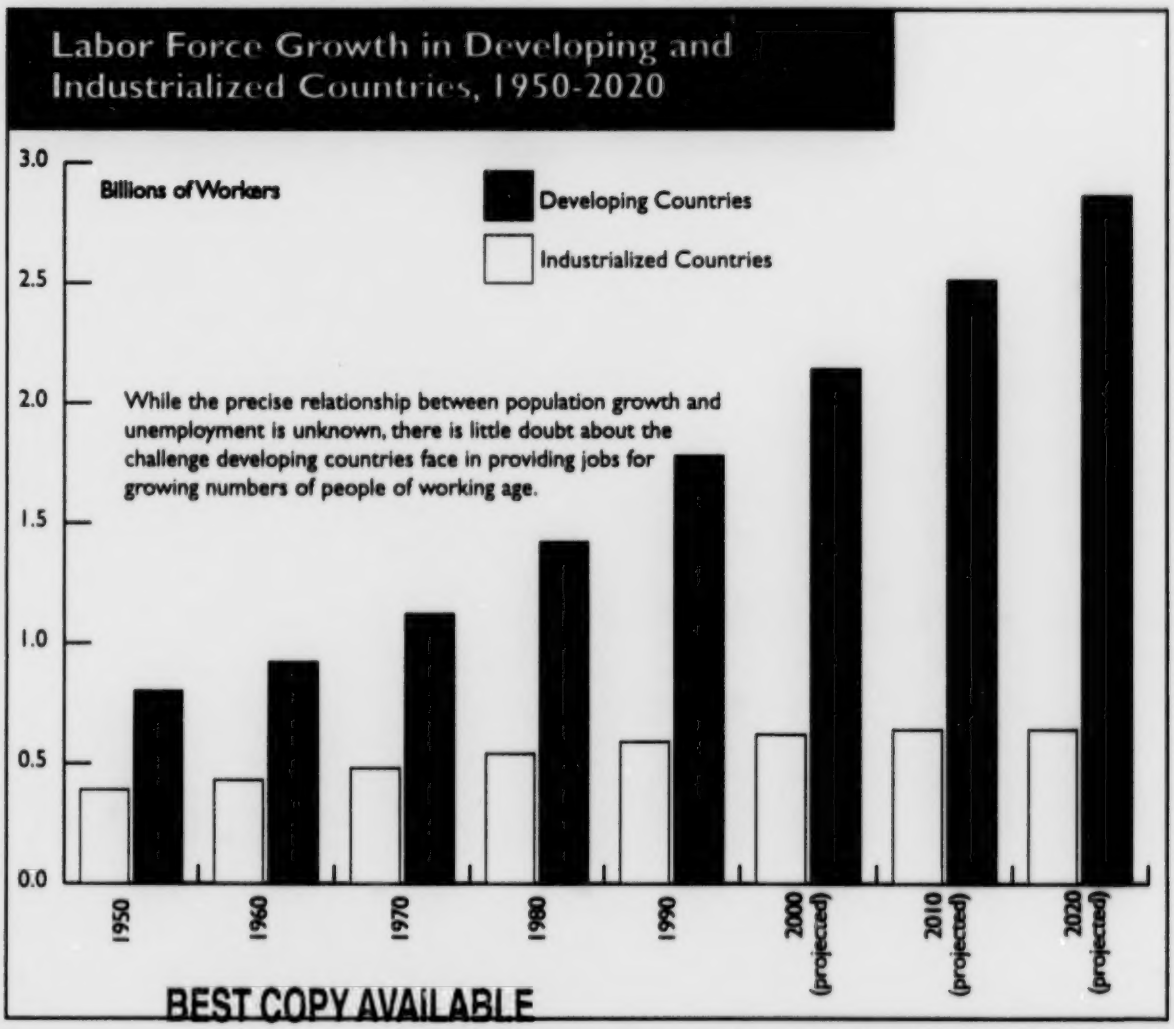
5. Cohen, *How Many People Can the Earth Support?*

6. U.S. Commerce Department, "Preliminary Data Release: U.S. Jobs Supported by Exports of Goods and Services," (Washington, D.C.: U.S. Commerce Department, 17 June 1996).

jobs and wages

Although the precise relationship between population dynamics and employment is uncertain, it is clear that slowing population growth can help raise wages, especially for less skilled jobs.

Economists generally accept that, all else being equal, increases in the size of a labor force tend to bring about decreases in average wages relative to capital costs, although the analysts disagree on the significance of this impact.[1] It is clear that the rapid population growth of the past few decades has helped fuel the high unemployment and underemployment rates that contribute to the low cost of labor in many countries. Babies born when world population growth reached its peak rate around 1970 are now in their mid-twenties. When U.S. jobs are moved abroad, the shift is based on a "rational" market decision to produce goods where production costs are lower. While many factors



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Data: International Labour Organization, Economically Active Population, 1950-2025, *1986.*

influence employment rates and average wages, an important one is the relative balance between the number of people wanting to work, the paid employment available, and the wages that will fill the available jobs as inexpensively for employers as possible. This is the basic economic principle of supply and demand. While the influence of rapid population growth on high-wage jobs is uncertain, few economies can generate enough of these jobs to accommodate annual increases in job seekers.

In just the next 20 years, the world's labor force is projected to grow by 730 million people, with more than 90 percent of that increase in developing countries. This number is larger than all the workers employed today in industrialized countries.[2] As Yale University historian Paul Kennedy has noted, the global economy must generate at least 40 million additional jobs each year to keep pace with population growth. "If we cannot produce decent employment for millions of young people in America, Europe, Russia and perhaps now even Japan, what prospects do we offer to the emerging hundreds of millions of men and women in the developing world?" he asks.[3]

Levels of unemployment can vary tremendously even among countries with very low levels of average per capita income. In 1993, official unemployment rates were less than 2 percent in Bangladesh but 14 percent in Nicaragua and Egypt, all of which had per capita incomes of less than $4,000 annually.[4] The obvious link between the growth of the labor force and the proportional need for job creation, however, suggests that lower rates of population growth would have a favorable impact both on unemployment rates and the inequalities in wages that exist today in some wealthy and many less wealthy countries. And, indeed, when World Bank analysts attempted to unravel the forces at work in promoting both high rates of economic growth and reductions in income inequality in several East Asian countries, rapid fertility decline emerged as one of the most important factors the countries had in common.[5]

1. Nancy Birdsall, "Government, Population, and Poverty: A Win-Win Tale" in Robert Cassen, ed., *Population and Development: Old Debates, New Conclusions* (New Brunswick, New Jersey: Transaction Publishers, 1994).

2. Michael Teitelbaum, presentation to a meeting on the environmental impacts of migration sponsored by the Pew Global Stewardship Initiative in Washington, D.C., 19 January 1994.

3. Paul Kennedy, "The Jobs Crisis is Worldwide, Ominous and Growing," *The International Herald Tribune* cited in *Worldwatch*, vol. 9, no. 3 (May-June 1996).

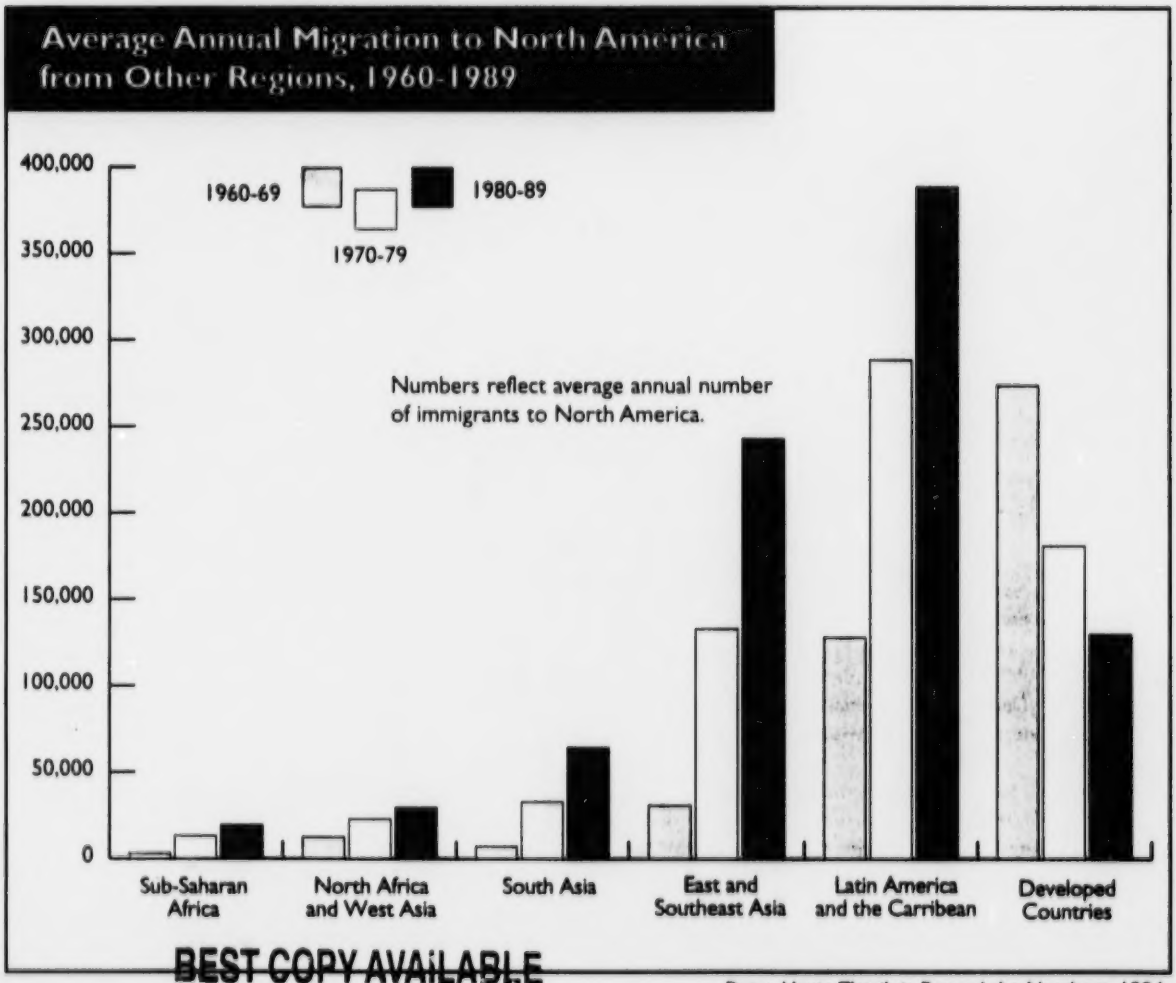
4. World Bank, *Workers in an Integrating World* (Oxford: Oxford University Press, 1995).

5. World Bank, *The East Asian Miracle* (Oxford: Oxford University Press, 1993); Rodolfo A. Bulatao, "A Response," in Michael Cromartie, ed., *The Nine Lives of Population Control* (Grand Rapids, Michigan: William B. Eerdmans, 1995).

migration

Population pressures are an important factor contributing to international migration.

Migration has surged in the past few decades, with more than 100 million people today living in a country different from the one in which they were born.[1] Although there are many reasons for this surge, a key underlying one is the dramatic demographic growth of the past few decades. This has led, with a 15 to 20 year time lag, to the rapid growth of the world's labor force, especially among the young adults who make up the age group most likely to migrate.[2] One migration expert has called this demographic shift "a profound disturbance over the last 100 years in the space-population ratio," which, in combination with an "overwhelming pace of technological change," has led to a "deterioration in the relationship between economic growth and employment."[3] Researchers have documented this linkage more often in the case of rural-urban migration than in that of



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Data: Hania Zlotnik in Beyond the Numbers, *1994.*

international migration, but there is no reason to doubt that the forces at work are similar in both situations. Such cases as the migration of Vietnamese villagers to the thinly populated Cambodian countryside[4] or the boat people of Haiti (who have risked death at sea to emigrate even in times of relative political security in their country) indicate the importance of rapid population growth in international migration.

It is unlikely that local economies will generate the jobs needed to employ the tens of millions of people added to the labor force each year, and the search for decent jobs is the leading reason people migrate. When the growth of a country's labor force outpaces its creation of jobs, it is only logical that people will seek employment in other countries where they perceive good jobs are plentiful. There is also the growing possibility that deteriorating environmental conditions related to population growth—water and food shortages, for example, or human-induced climate change—will spur large movements of population across international borders.[5] Lower rates of population growth can help ease the pressures to migrate and improve the underlying conditions that force many people to seek a better life elsewhere.

Even in the short term, population programs that provide greater access to family planning and better educational and economic opportunities for women make it easier for families to improve their lives in their home communities. Access to family planning and other reproductive health services for recent migrants improves their health and well-being and arguably helps ease their assimilation in the communities that have received them.[6]

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1. United Nations Population Fund (UNFPA), *The State of World Population* (New York: UNFPA, 1993).

2. Sharon Stanton Russell and Michael S. Teitelbaum, "International Migration and International Trade," *World Bank Discussion Paper 160* (Washington, D.C.: World Bank, 1992).

3. Nino Falchi, *International Migration Pressures: Challenges, Policy Responses and Operational Measures: An Outline of the Main Features* (Geneva: International Organization for Migration, March 1995).

4. Hal Kane, *The Hour of Departure: Forces that Create Refugees and Migrants* (Washington, D.C.: Worldwatch Institute, 1995).

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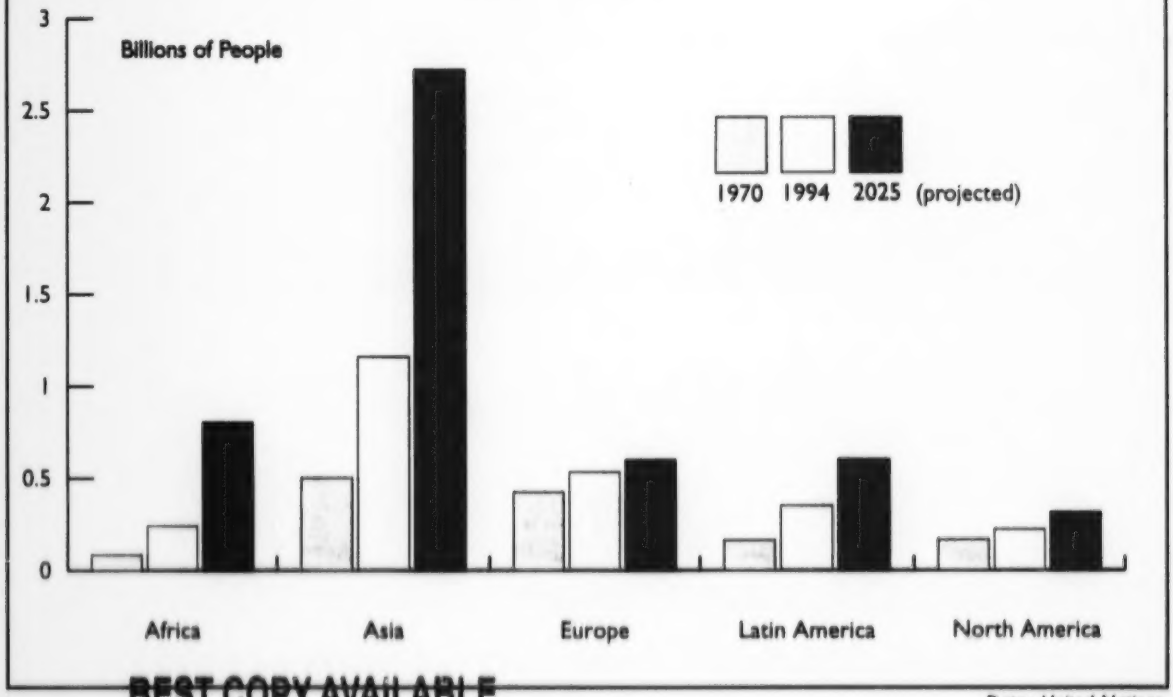
6. United Nations, "Recommendations," *Population Distribution and Migration: Proceedings of the United Nations Expert Meeting on Population Distribution and Migration, Santa Cruz, Bolivia, 18-22 January 1993* (New York: United Nations, 1994); Johns Hopkins Population Information Program, "Reproductive Health Care for Urban Migrants," *Population Reports (Preview Edition)*(Baltimore, Maryland: The Johns Hopkins University, June 1996).

urbanization

The growth of urban areas has produced concentrations of human population of unprecedented magnitude, and governments are failing to manage the resulting environmental and social service problems.

The interaction between population dynamics and environmental and social problems is important to Americans because population growth and environmental degradation can contribute both to migration pressures and to the potential for civil conflict. The population-environment interaction is a factor in the growing proportion of the world's people who live in and around cities. Population growth fuels the growth of urban areas in two ways: as "natural increase," stemming from high birth rates within metropolitan areas, and as migration from outlying rural areas, where the labor force tends to grow more rapidly than employment. Urban populations are growing faster than those of surrounding areas. The average growth rate for cities and their environs in developing countries is 3.5 percent a year, compared to 1.9 percent for these countries as a whole.[1] Indeed, a recent study

Number of People Living in Urban Areas, 1970, 1994 and 2025



Data: United Nations

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of national and urban population growth in developing countries found that on average each 1 percent increase in national population growth yields a 1.78 percent increase in urban population.[2]

The population increments being added to urban areas in developing countries today have no precedent in history, so there is little guidance to predict the magnitude of the problems they may pose. But it is clear that many cities have reached the point where further population growth jeopardizes the delivery of basic services to all.

People move to cities to improve their economic opportunities and quality of life, and urban migrants have often adapted swiftly to the stresses of city life. As a recent United Nations report on urban areas notes, however, "the situation is rapidly changing. Many options previously available to low-income urban populations, such as that of settling in unused public land and low-density central city neighborhoods, are rapidly disappearing. While the demand for land is growing—indeed, it has been calculated that rapid urbanization is likely to lead to a doubling in size of built-up urban areas in most developing countries over the next 15 to 20 years—the supply in most developing country cities is both genuinely and artificially limited."[3]

The environmental byproducts of large and concentrated urban populations pose direct threats to health and to the quality of city life. In Mexico City, considered home to the world's worst air pollution, most children who are tested have elevated lead levels. Ozone pollution, with concentrations that are often three times as high as the World Health Organization's safety standard for ozone,[4] have led the city's government to curtail driving and industrial activity to help clear the air. A recent scientific study suggests that the primary culprit for the city's air pollution may be the combustion of liquefied petroleum gas, which is used to heat homes and cook food throughout the city.[5] At the same time, the need to provide fresh water to a growing population of about 16 million in an arid mountain valley has forced Mexico City to overdraw its underground supplies of fresh water and pipe water from across the surrounding mountains, at a high and growing cost in electricity. The level of the city's aquifer is sinking by more than three feet per year, causing land to subside and structures to buckle in the city's center.[6]

In Cairo, a city of nearly 10 million people, space in public parks is in such demand that many charge admission. Even the grassy median of the road between the city and its airport has become the scene of family picnics, with cars whizzing by a few yards away.[7] The further adaptations that continued population growth will require in many urban areas are hard to imagine.

1. World Resources Institute, *World Resources 1996-97*. (New York: Oxford University Press, 1996).

2. Andrew Mason, "Population, Housing and the Economy," in Dennis A. Ahlburg et al., eds., *The Impact of Population Growth on Well-being in Developing Countries* (Berlin: Springer, 1996).

3. United Nations Population Division, *The Challenge of Urbanization: The World's Large Cities* (New York: United Nations, 1995).

4. "Mexico City Sets Pollution Record," Reuters wire service release in *The Washington Post*, 16 March 1992.

5. Anthony DePalma, "Cooking Gas, Not Cars, May Cause Mexico City Smog," *The New York Times*, 18 August 1995.

6. World Resources Institute, *World Resources 1996-97* (New York: Oxford University Press, 1996).

7. John Lancaster, "In Cairo, It's Not Easy Being Green," *The Washington Post*, 20 May 1996.

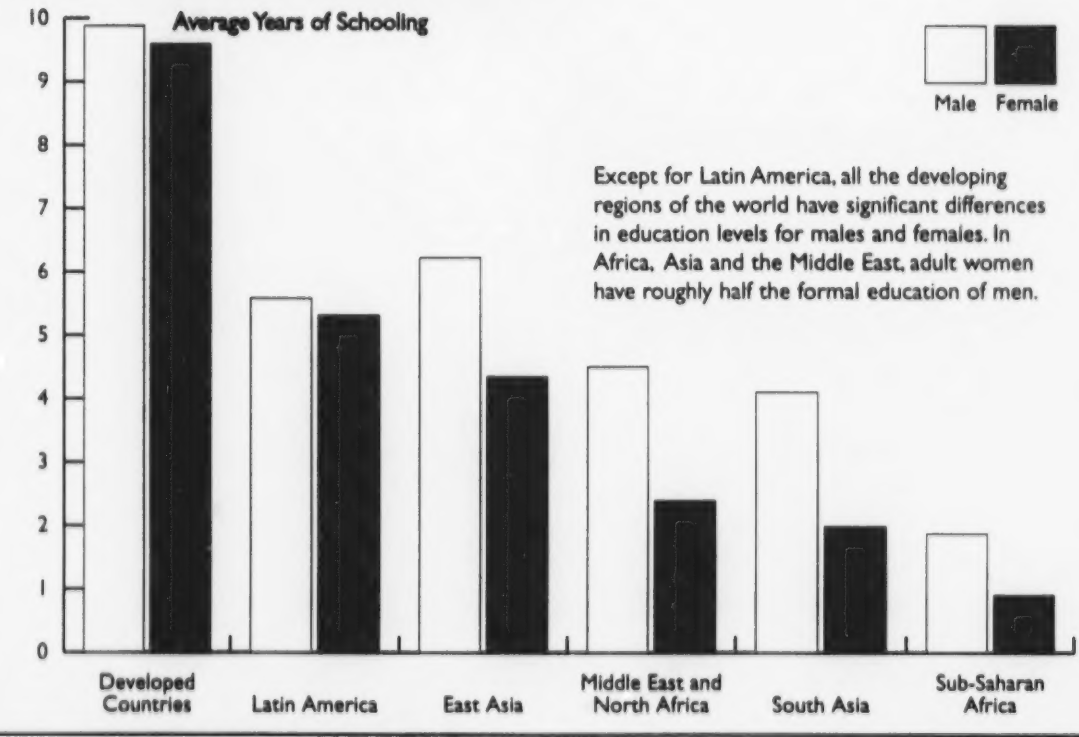
education

Large family size and rapid population growth challenge the ability of governments, teachers and parents to meet the educational needs of young people.

The success of many developing countries in expanding educational opportunity has been remarkable, considering how fast their school-age populations have grown. The evidence nonetheless suggests that governments already committed to educating their citizens face a more manageable task when each entering class of students is not much larger than the one that entered the previous year. The amount of government money per pupil in developing countries, for example, tends to decline as rapid population growth proceeds. Eventually, many governments adapt to this trend by shifting expenses to parents in the form of educational fees for school supplies.

Among poor families in developing countries, large family size may undermine economic opportunities for parents—and, through potential

Gender Gap in Educational Attainment, by Region



Source: *Population Action International*

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impacts on schooling, ultimately for their children. Studies of the impact of family size on educational attainment have produced mixed findings. But the weight of the evidence suggests at least modest educational advantages for families with fewer children.[1] Mothers with many children have less opportunity to earn income because of the attention their children require. Parents must devote relatively higher proportions of their income to their children's food, health and educational needs, at the cost of higher levels of saving and investment.

In Ghana, one study found that girls in large families were somewhat less likely than girls in smaller families to stay in school. Their parents apparently tended to invest their limited financial resources in the education of sons, thinking them a better bet for future earnings. Girls also more typically care for younger siblings, an activity that reduces the time available for class attendance and homework.[2] Without reaching the upper grades in school, girls are far less likely to contribute to their nations' economies when they grow up, and they are more likely to bear children early.

1. Allen C. Kelley, "The Consequences of Rapid Population Growth on Human Resource Development: The Case of Education," in Dennis A. Ahlburg et al., eds., *The Impact of Population Growth on Well-being in Developing Countries* (Berlin: Springer, 1996).

2. Cynthia B. Lloyd and Anastasia J. Gage-Brandon, "High Fertility and Children's Schooling in Ghana: Sex Differences in Parental Contributions and Educational Outcomes," *Population Studies*, vol. 48, no. 2 (July 1994); Lloyd and Gage-Brandon, "Does Sibsize Matter? The Implications of Family Size for Children's Education in Ghana," Research Division, Working Paper no. 45 (New York: Population Council, 1992).

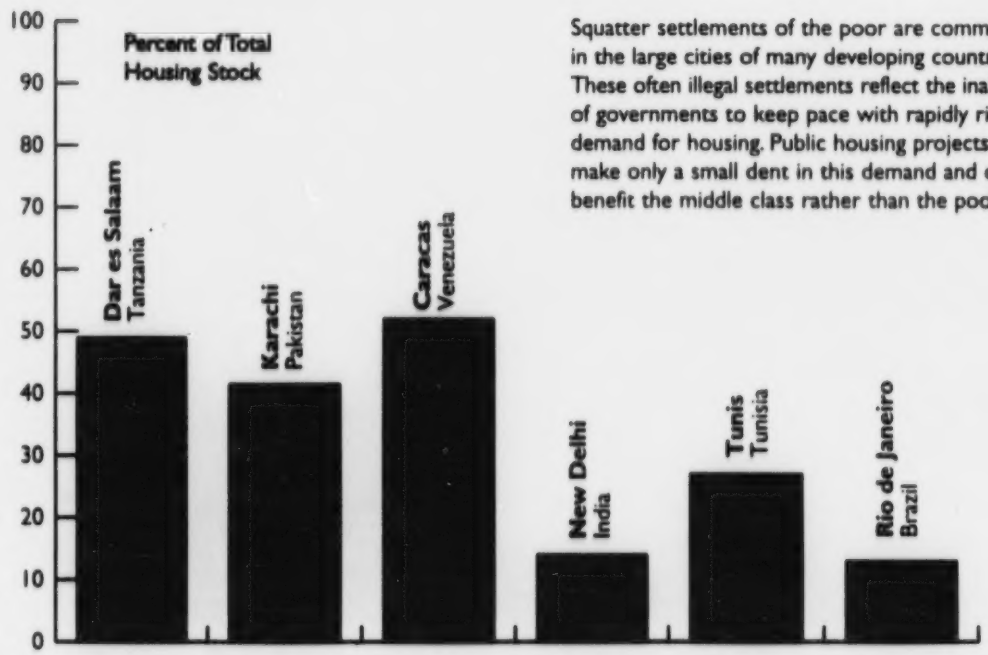
housing

The price of housing in developing country urban areas tends to rise while housing quality tends to fall in response to rapid population growth.

According to the UN Centre for Human Settlement, at least 600 million people in the urban areas of Asia, Africa and Latin America occupy "housing of such poor quality and with such inadequate provision for water, sanitation and drainage that their lives and health [are] under continuous threat." Yet just during the 1990s, the number of people living in such cities is projected to grow by another 600 million. "Without major improvements in housing markets and in the expansion and improved provision of infrastructure and services," the UN agency concludes, "the number of people living in such conditions will expand very rapidly."[1] Global population growth and urbanization (itself closely related to population growth) are among the forces behind unhygienic housing conditions that foster respiratory and other infectious diseases in urban areas.[2] This relationship is evident to city dwellers themselves: In India, 70-year old Mangi Deva told a reporter that she hoped soon to learn how to use an indoor toilet, "because population growth is making open space harder to find."[3]

Squatter Housing as a Percent of Total Housing Stock, Selected Cities, 1990

Note: Squatter housing is defined as that which is currently occupying land illegally.



Squatter settlements of the poor are common in the large cities of many developing countries. These often illegal settlements reflect the inability of governments to keep pace with rapidly rising demand for housing. Public housing projects make only a small dent in this demand and often benefit the middle class rather than the poor.

Data: World Resources Institute, United Nations Centre for Human Settlements (Habitat), and World Bank

The relationship between fertility, population growth and economics is extremely complex. Nonetheless, the number of households and individuals seeking shelter is obviously a factor driving housing demand. The ratio of growth of residential construction compared to growth in total population is a much used indicator of housing conditions. A review of the limited research in the field led population analyst Andrew Mason to conclude: "Rapid growth in the demand for housing is an inevitable outcome of rapid population growth. To the extent that this demand is accommodated, growth-oriented investment is likely to be impeded and economic growth slowed…To the extent that increased demand for housing is not accommodated, crowding, squatter settlements, homelessness and/or lower housing quality will result…National population growth has contributed to more rapid urban population growth, higher residential land prices, crowding, a deteriorating urban environment, and inadequate housing for many urban residents."[4]

1. United Nations Centre for Human Settlements (Habitat), *An Urbanizing World: Global Report on Human Settlements, 1996* (Oxford: Oxford University Press, 1996).

2. World Health Organization, *The World Health Report 1996: Fighting Disease, Fostering Development* (Geneva: World Health Organization, 1996).

3. Peter Waldman, "For the Lowest Caste, Clearing India's Toilets Remains Life's Work," *The Wall Street Journal*, 20 June 1996.

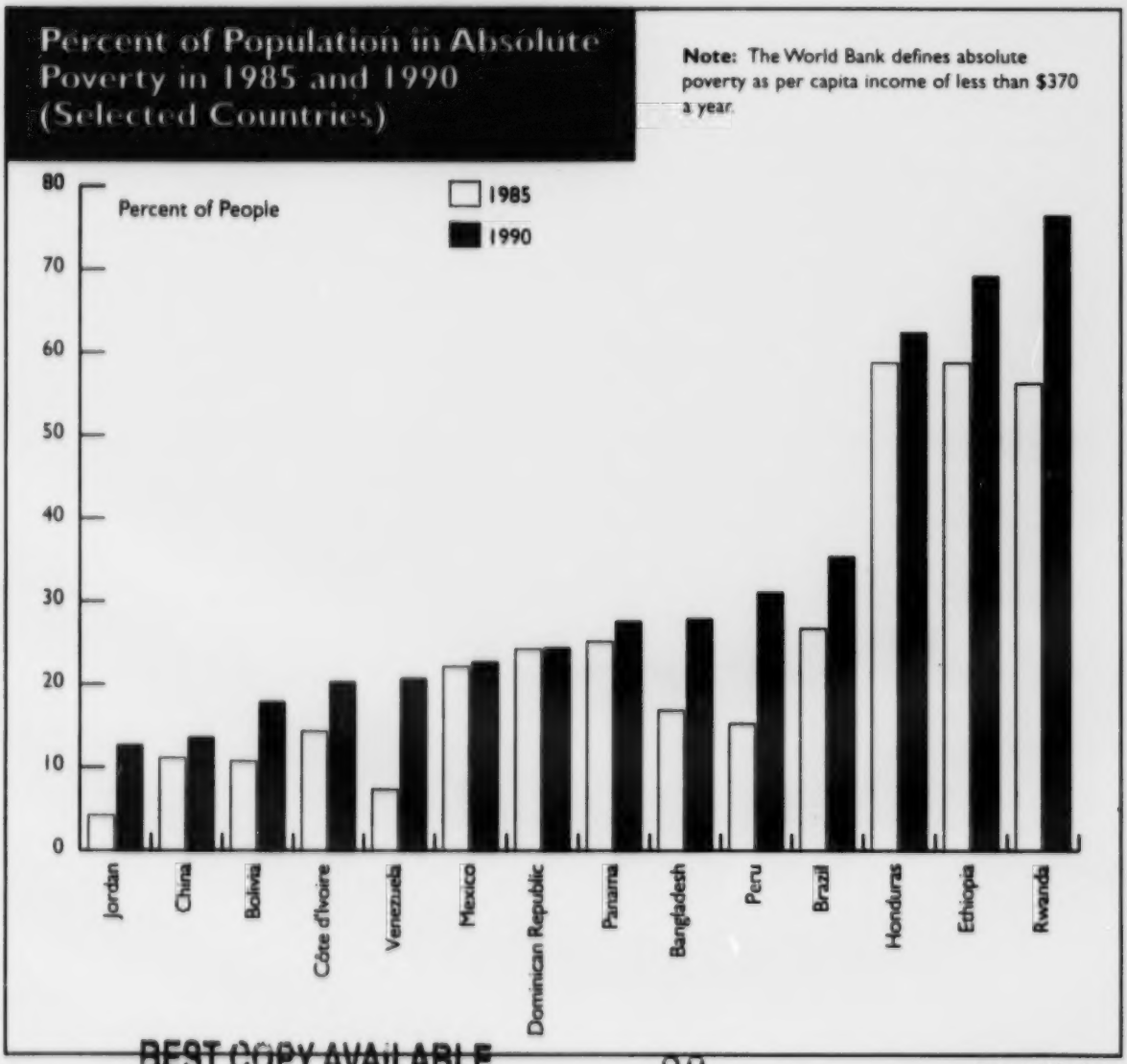
4. Andrew Mason, "Population, Housing, and the Economy," in Dennis A. Ahlburg et al., eds., *The Impact of Population Growth on Well-being in Developing Countries*. (Berlin: Springer, 1996).

poverty

Poverty often widens and deepens as one indirect effect of population growth.

An estimated 20 percent to 25 percent of the world's population live in "absolute poverty," defined as per capita income of less than $370 a year. More than 90 percent of such people live in developing countries, which are experiencing more than 90 percent of the world's population growth.[1]

Rapid population growth is commonly assumed to be a "root cause" of poverty, but in reality the argument has never been substantiated. If population growth plays a role in poverty, it does not act alone.



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In many countries in recent decades population growth has had impacts that contribute to poverty, such as the growing inability of governments to provide adequate sanitation, health care services and education. The relationship is clearer if poverty is defined broadly to include not just insufficient economic income and assets, but inadequate education and health and an incapacity to develop the potential for a creative and productive life.[2] In certain countries and at certain levels of population size, further or rapid population growth may negatively influence economic growth itself. Rapid population growth, high fertility and closely spaced births can contribute to poor maternal and child health, degrade or restrict access to common or community property, and reduce per capita availability of arable land and renewable fresh water. To the extent that population growth impedes the improvement of children's health and educational opportunities, it tends to lock subsequent generations into poverty as well.[3]

Pressures relating to population growth contribute to a lack of adequate housing and undermine social services and transportation networks on which the poor depend for well-being and livelihood. Population growth helps to drive urbanization, and the urban poor often lack access to the communal and other non-monetary assets that sometimes serve as a buffer for the rural poor. Exposure to environmental toxins and unsafe water disproportionately jeopardizes the health of the urban poor.[4]

Recent global surveys suggest that the income gap between rich and poor is growing in many wealthy countries—including the United States—as well as less wealthy ones. More than 3 billion people, or half of humanity, subsist on less than $2 a day, and both the number of people and the proportion of total population living in such extreme poverty are rising. In most of the countries in which economic growth has actually narrowed the income gap between the poorest and richest (principally in Scandinavia and East Asia), governments have invested heavily in health, education, credit for low-income entrepreneurs and the advancement of women.[5] Such social policies tend to have the added benefit of reducing birth rates.

"Although it is not clear whether population growth causes poverty in the long run or not," population analyst Dennis A. Ahlburg writes, "it is clear that high fertility leading to rapidly growing population will increase the number of people in poverty in the short-run, and in at least some cases make escape from poverty more difficult."[6]

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1. United Nations Centre for Human Settlements (Habitat), *An Urbanizing World: Global Report on Human Settlements, 1996* (Oxford: Oxford University Press, 1996).

2. United Nations Development Programme, *Human Development Report 1990* (New York: Oxford University Press, 1990).

3. Dennis A. Ahlburg, "Population Growth and Poverty," in Dennis A. Ahlburg et al., eds., *The Impact of Population Growth on Well-being in Developing Countries* (Berlin: Springer, 1996).

4. United Nations Population Fund (UNFPA), *The State of World Population 1996* (New York: United Nations, 1996).

5. United Nations Development Programme (UNDP), *Human Development Report 1996* (New York: Oxford University Press, 1996).

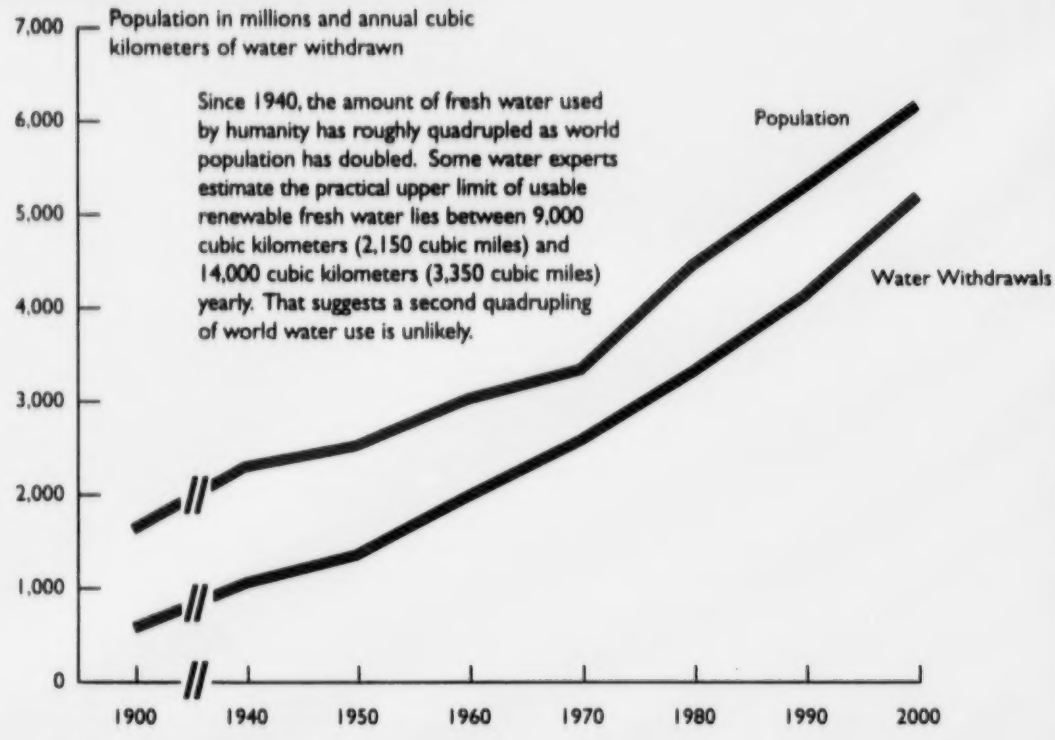
6. Dennis A. Ahlburg, "Population Growth and Poverty," in Robert Cassen, ed., *Population and Development: Old Debate, New Conclusions* (New Brunswick, New Jersey: Transaction Publishers, 1994).

water

The world's fresh water is insufficient to meet the needs of a much larger population for long time periods, and no technology in sight can fill the gap.

The planet's renewable fresh water is finite—10,000 cubic miles' worth is available each year on average—and constraints on its availability and use are increasingly evident. The growth of population inevitably limits the average availability of fresh water per person. To the extent residential, commercial and industrial development ignores these natural constraints, the growing human thirst for fresh water comes at the expense of natural ecosystems and threatens the survival of animal and plant species. In years past, water scarcity was at most a local or temporary problem, but it is now becoming pervasive and persistent in some regions of the world. Desalination is too labor- and energy-intensive to add much to the world's supply of fresh water or to contribute to the availability of fresh water for agriculture. Pricing water appropriately can encourage more efficient use, but much of the

World Population and Fresh Water Use from 1900 to 2000


Population in millions and annual cubic kilometers of water withdrawn
Since 1940, the amount of fresh water used by humanity has roughly quadrupled as world population has doubled. Some water experts estimate the practical upper limit of usable renewable fresh water lies between 9,000 cubic kilometers (2,150 cubic miles) and 14,000 cubic kilometers (3,350 cubic miles) yearly. That suggests a second quadrupling of world water use is unlikely.
Population
Water Withdrawals
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
1900
1940
1950
1960
1970
1980
1990
2000

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Source: Population Action International, Sustaining Water.

world's use of water is not even metered and will be difficult to price. Even if technologically feasible, any solution to water shortages that involves moving massive amounts of water over long distances would have major impacts on the environment, altering or destroying wetlands and riparian habitats essential to the survival of other species.

In 1995, about 386 million people in 31 countries lived in conditions of water stress or water scarcity, based on hydrological benchmarks of the minimum annual per capita availability of renewable fresh water needed for economic development.[1] By 2020 the number of people living in such conditions could be as high as 2.9 billion or as low as 1.2 billion, depending on the rate of population growth over the next 24 years.[2] By one recent estimate, more than half of all the world's accessible renewable fresh water is already being used, indicating the problems the world may face if population doubles.[3]

One of the largest recipients of U.S. foreign aid, for example, is Egypt, whose 62 million people depend for essentially all their water on the flow of the Nile River. Among the greatest threats to Egypt's long-term security is the fact that nine other nations have access to the Nile's water before it flows into Egypt. More than 80 percent of the river's water rises out of just one nation, Ethiopia, which has a rapidly growing population and ambitious plans for the development of its water resources. The countries that share the Nile—including Kenya, Burundi, Rwanda, Uganda, Eritrea, Tanzania and Zaire—face a long process of learning to cooperate on water development and conservation. They also face the need to stabilize their populations before pressing against the limits of their finite supplies of renewable fresh water, and before peace in the Nile River basin is threatened by water scarcity.[4]

Lack of water is already a desperate problem with little hope of long-term resolution in densely populated urban environments such as Mexico City and Beijing. This is not just a developing world problem. Rapidly growing cities in Texas, California, Florida, Arizona and Nevada are finding that the availability of renewable fresh water is constraining their prospects for continued growth.

Fresh water is essential for farming, for industry, for human health and life itself. Every living being on land and in lakes and rivers requires it, and the more water humans use the less remains for non-human species, many of them already threatened by habitat loss. There is much scope for using water more efficiently, and some scope for developing new water sources. Nonetheless, the difficulty of matching human needs to the earth's supply of renewable fresh water can only increase as population grows. Slower growth can provide needed time for developing creative solutions to water scarcity.

1. Based on the work of Swedish hydrologist Malin Falkenmark. See, for example, Malin Falkenmark and Carl Widstrand, "Population and Water Resources: A Delicate Balance," *Population Bulletin* (Washington, D.C.: Population Reference Bureau, 1992).

2. Robert Engelman and Pamela LeRoy, *Sustaining Water: Population and the Future of Renewable Water Supplies* (Washington, D.C.: Population Action International, 1993); Engelman and LeRoy, *Sustaining Water: An Update* (Washington, D.C.: Population Action International, 1995). Population Action International calculations for *Sustaining Water: An Update*.

3. Sandra L. Postel et al., "Human Appropriation of Renewable Fresh Water," *Science* 271 (February 9, 1996).

4. Peter H. Gleick, ed., *Water in Crisis: A Guide to the World's Fresh Water Resources* (New York: Oxford University Press, 1993).

food

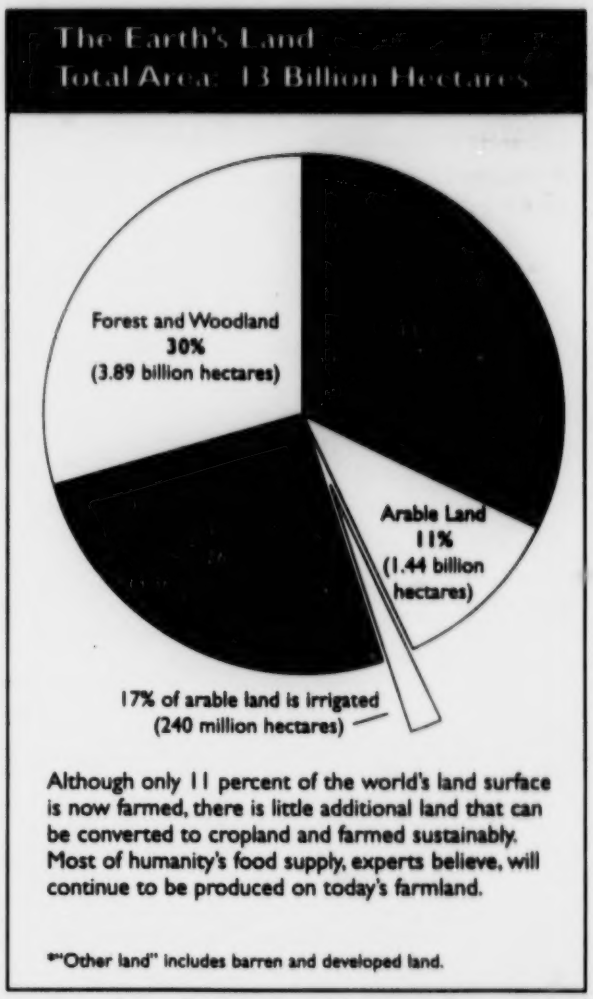
The capacity of farmers to feed the world's future population is also in jeopardy, especially as higher incomes boost the per capita demand for meat, fish and other foods that require intensive use of natural resources to cultivate.

The food of the future will be produced mostly on today's farmland, and much of that farmland is deteriorating. Already, the world loses about 27.5 billion tons of topsoil through erosion each year,[1] and an area of land the size of the United States and Mexico has already lost much of its productive potential due to human activities.[2] The area of farmland worldwide is now expanding only one-eighth as fast as population.[3] In order to feed more people, farmers must work each acre much more intensively, raising the risk of further soil degradation.

Farmers produce enough food today to feed everyone in the world. But since many people cannot afford to buy this food, an estimated 800 million human beings are chronically malnourished. This is a distribution problem for which no easy solutions are evident. Even if it could be resolved, however, in little more than two decades farmers probably will need to produce 50 percent more food than they do now[4] just to keep up with population and economic growth. Given current trends in natural resource availability, they will not be able to use more land and fresh water to accomplish this task.

Technological advances have done much to enable farmers to keep pace with population growth. But this progress has stagnated in the past decade, and in recent years grain prices have risen while reserves have plummeted. Indeed, over the past few decades, advances in crop yields have come mostly through increasing the number of plants per acre and the food to non-food material in each plant. Advances in livestock production have come largely from raising the proportion of animal feed that is devoted to the production of usable animal products. "There are severe physiological constraints," notes agricultural economist Vernon W. Ruttan, "to continued improvement along these conventional paths."[5]

It may be too much to expect that yields of all major crops will rise by half or more from their current levels. This is especially true given the depen-



Although only 11 percent of the world's land surface is now farmed, there is little additional land that can be converted to cropland and farmed sustainably. Most of humanity's food supply, experts believe, will continue to be produced on today's farmland.

*"Other land" includes barren and developed land.

Source: Population Action International, Conserving Land.

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dence of farmers on sufficient fresh water and decent weather for growing crops. Today, water for agriculture is rapidly becoming more scarce and the global climate may be changing in unpredictable ways.

These arguments are anything but academic. In most African countries and in Jordan, Mexico, Afghanistan and the Philippines, increases in food production are lagging those in population. Struggling to feed their families, many farmers clear land of trees or misuse pesticides and fertilizers. Often the increases in harvests gained through such methods are short-lived, because the new land is unsuitable for long-term farming and the fertilizers and pesticides themselves threaten human health and the environment.

The immediate reasons for world hunger today may be income disparities and the inequitable distribution of food. Food insecurity also stems in part from inappropriate agricultural policies and the poverty of many of today's farmers. Rapid population growth tends to make such problems even more intractable. By increasing the human demands on food production and distribution, population growth increases the chance that many countries will become dependent on food imports.

As the world's leading food exporter, the United States could benefit economically from this trend—assuming importing countries have healthy economies and can purchase the food their people need. The benefit might not last, however. Rising global demand could at some point outstrip farmers' capacity to boost their production—especially when extreme weather robs harvests of their full potential, as has occurred in recent years. Food is a global commodity, so such imbalances in the world's largest food producing country inevitably raise food prices everywhere. When this occurs, Americans, in effect, are bidding against the citizens of other countries for the food we cultivate at home.[6]

This is an environmental as well as an economic issue for Americans. At a time when concerns are rising about the health effects of widely used synthetic compounds, the U.S. Environmental Protection Agency reports that U.S. farmers applied record amounts of pesticides in 1994 and 1995, not because they require a greater volume of pesticides per acre—the reverse is true—but because they cultivated many more acres in those two years. Among the reasons for this increase in land under cultivation and corresponding boost in pesticide use, was the need to satisfy growing international demand for U.S. crops.[7] It is U.S. soil, water, wildlife and farmers themselves (and their families) that suffer the environmental and health impacts of our growing importance as the world's breadbasket.

The likelihood that many countries will be unable to pay for the food their people need raises the risk of dependence on food aid. The United States provides more of this assistance than any country in the world, but will it be able to continue to do so indefinitely, especially if food prices keep rising? Such questions point to the need to work in international partnerships to sustainably increase food production in poorer countries. They also point to the need to stabilize population.

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1. These are short tons, as in common American usage in reference to 2,000 pounds. The original figure of 25 billion metric tons is an FAO estimate cited in Robert Engelman and Pamela LeRoy, *Conserving Land: Population and Sustainable Food Production* (Washington, D.C.: Population Action International, 1995).

2. L.R. Oldeman et al.,"The Extent of Human-Induced Soil Degradation," Annex 5 of L.R. Oldeman et al., *World Map of the Status of Human-Induced Soil Degradation: An Explanatory Note*, rev. 2nd ed. (Wageningen, the Netherlands: International Soil Reference and Information Centre, 1990), Table 7, as cited in World Resources Institute, *World Resources 1992-93*, (New York: Oxford University Press, 1992). Calculation on United States and Mexico's land area by PAI.

3. Engelman and LeRoy, *Conserving Land*.

4. This is a very rough calculation based on a projected 32 percent increase in population by 2020, plus economic growth leading to greater meat consumption in China, India and other major developing countries, plus production needed to improve diets among 800 million malnourished people.

5. Vernon W. Ruttan, "Population Growth, Environmental Change and Technical Innovation: Implications for Sustainable Growth in Agricultural Production," in Dennis A. Alhburg et al., eds., *The Impact of Population Growth on Well-being in Developing Countries* (Berlin: Springer, 1996).

6. Lester Brown, *Who Will Feed China: Wake-up Call for a Small Planet* (New York: W.W. Norton, 1995).

7. "Use of Pesticide in U.S. on the Rise, EPA Says," Reuters wire service release in *The Washington Post*, 29 May 1996.

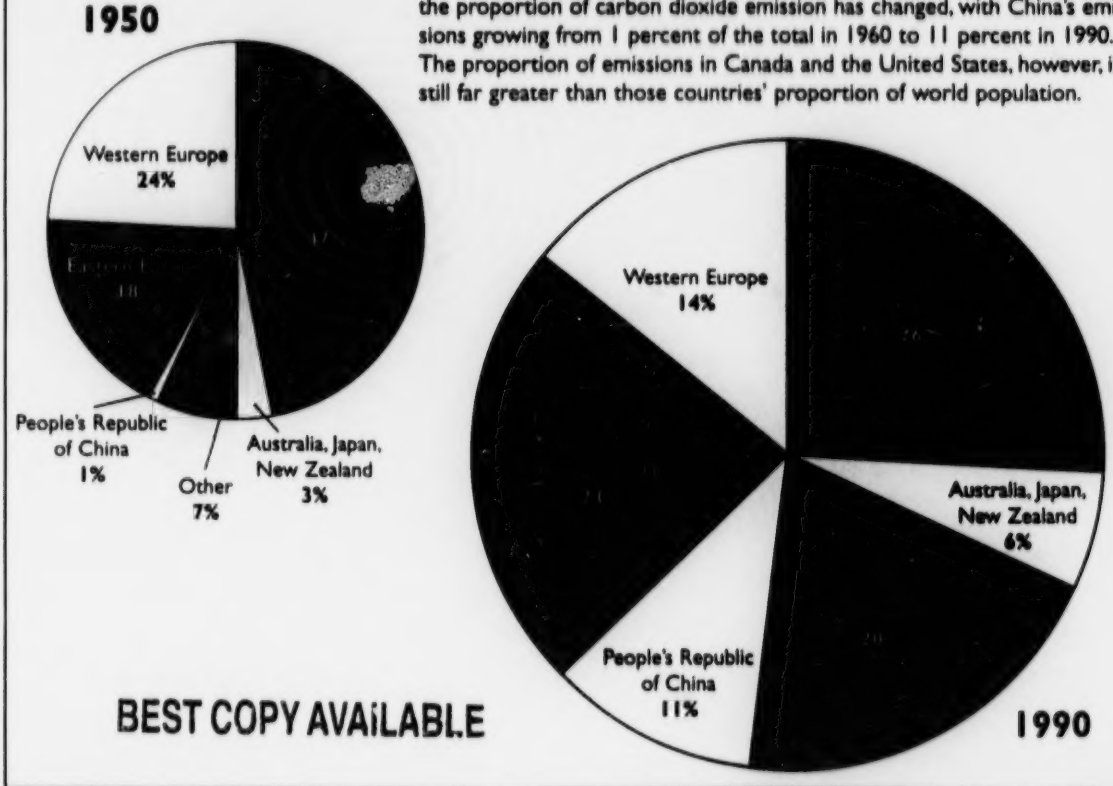
atmosphere and climate change

Humanity is rapidly changing the earth's atmosphere, and thus, in all probability, its climate.

Many climate scientists agree that the increase of heat-trapping greenhouse gases in the atmosphere is already influencing the world's climate, although separating out the human influence in recent extreme weather events remains difficult. There is no doubt, however, that the human impact on climate is growing steadily. The combustion of fossil fuels such as oil, coal and natural gas is the dominant source of greenhouse gas emissions. And most of the activities associated with release of the gases—transportation, power generation, heating, cooling, cooking and most produc-

Carbon Dioxide Emissions by Region, 1950 and 1990

As the world's population has grown and industrialization has proceeded, the proportion of carbon dioxide emission has changed, with China's emissions growing from 1 percent of the total in 1960 to 11 percent in 1990. The proportion of emissions in Canada and the United States, however, is still far greater than those countries' proportion of world population.



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Source: Population Action International, Stabilizing the Atmosphere.

tion processes—are basic and pervasive. In effect, we are gambling with one of the planet's fundamental life support systems, and the stakes of this gamble are increasing with time.

A warming climate would alter patterns of rain and wind in unpredictable ways. More heat would lead to more rapid evaporation of water from land and oceans, and thus to greater precipitation alternating with more intense drought. Added heat would also energize weather systems that create hazardous storms. Warmer oceans would expand in volume and encroach onto inhabited coasts, while shifting climate regimes would threaten agriculture and ecosystems—and quite possibly human settlements—in the United States and elsewhere.

Few specialists doubt that human activities will change the world's climate noticeably, and many scientists believe the human impact is already evident. Responding to the dominant scientific view, the U.S. government has announced it will seek a binding international agreement to reduce the release of greenhouse gases into the atmosphere.[1] Just to keep emissions constant in any given country would require each individual on average to continually reduce his or her use of fossil fuels by an amount inversely proportional to that country's rate of population growth. With economic growth and associated consumption patterns (especially the growing popularity of automobiles in both wealthy and less wealthy countries), however, per capita use of fossil fuels is increasing, not decreasing. This increase is amplified as each year the world has more inhabitants.

Who can argue against people everywhere aspiring to enjoy a standard of living comparable to that of the United States? Yet with just 5 percent of the world's population the United States accounts for 22 percent of the world's fossil fuel consumption. A planet full of American-style consumers would multiply the world's carbon dioxide emissions by nearly five times current levels.[2] To stabilize atmospheric concentrations of the greenhouse gas carbon dioxide at anything close to current levels, however, humanity would need to reduce these emissions by 60 percent or more from current global levels through sharp reductions in the combustion of fossil fuel.[3] To reach such a goal, the average person would need to use no more of these carbon-emitting fuels than did the average person living in the first half of the 20th century—before widespread automobile ownership, electrification and overall economic development.[4] As world population grows and per capita natural resource consumption increases, the reductions in greenhouse gas emissions needed to stabilize the atmosphere and climate will become increasingly difficult to achieve.

1. John H. Cushman, "In a Shift, U.S. Will Seek a Binding Agreement by Nations to Combat Global Warming," *The New York Times*, 17 July 1996.

2. The calculation is based on multiplying the 1992 per capita U.S. industrial carbon dioxide emission (roughly 19.1 metric tons) by the 1992 world population (5.4 billion) and comparing the result (103.1 billion tons) to 1992 global industrial CO_2 emissions of about 21.5 metric tons. Population figures from United Nations; CO_2 figures (most recent available) from Carbon Dioxide Information Analysis Center, 1996, personal communication.

3. J. T. Houghton et al., *Climate Change: The IPCC Scientific Assessment*, Intergovernmental Panel on Climate Change (Cambridge: Cambridge University Press, 1993).

4. Robert Engelman, *Stabilizing the Atmosphere: Population, Consumption and Greenhouse Gases* (Washington, D.C.: Population Action International, 1994).

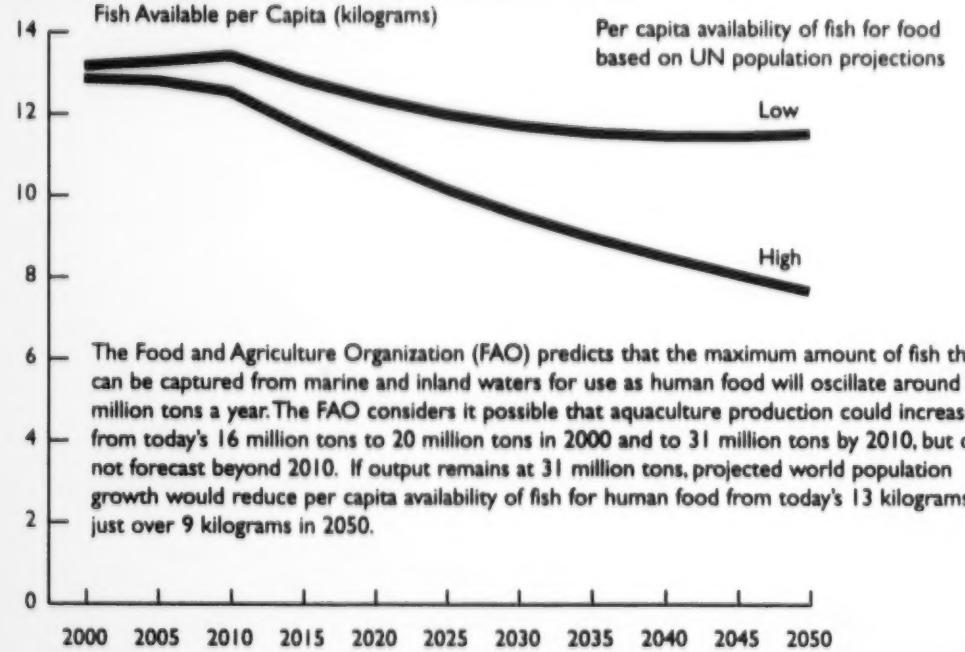
fisheries

The world's rivers, bays and oceans are now for all practical purposes fully fished, which means that increased harvests trigger declining stocks.

Despite impressive gains, aquaculture (fish farming) has failed to keep up with world population growth since 1989. The per capita availability of captured and farmed fish is now falling, contributing to rising prices and declining per capita consumption. The future growth of aquaculture is limited by competition for land and water and the growing challenge of keeping farm-raised fish free of disease. While greater efforts to conserve fish stocks are necessary and feasible, population growth rates will remain a major determinant of the prices consumers pay for fish.

The state of the world's fisheries illustrates a collision of human needs and natural resources that is occurring today. By the accounts of experts, the world's oceans and rivers are unlikely to supply more than 60 million metric tons per year of fish as food for human consumption, slightly above current levels. Aquaculture contributes roughly another 16 million tons today, and probably will contribute more in the future. But how much more? To sustain current per capita consumption to the middle of the next century under either the medium or high UN projection for population growth would

Projected Global Per Capita Availability of Fish for Food 2000-2050



The Food and Agriculture Organization (FAO) predicts that the maximum amount of fish that can be captured from marine and inland waters for use as human food will oscillate around 60 million tons a year. The FAO considers it possible that aquaculture production could increase from today's 16 million tons to 20 million tons in 2000 and to 31 million tons by 2010, but does not forecast beyond 2010. If output remains at 31 million tons, projected world population growth would reduce per capita availability of fish for human food from today's 13 kilograms to just over 9 kilograms in 2050.

Data: Food and Agriculture Organization and United Nations

require fish farmers to supply more food than all the world's oceans, rivers and lakes combined.[1] Fisheries experts doubt aquaculture can go much beyond twice its current output, if that. The limitations on suitable land for ponds and pens and dependable water supply, and the difficulties of keeping farmed fish in a state of reasonable health, are simply too great. Over the long term, only a stabilized world population is likely to be compatible with sustainable exploitation of the world's fisheries.

1. Robert Engelman and Pamela LeRoy, *Catching the Limit: Population and the Decline of Fisheries* (Washington, D.C.: Population Action International, 1995); Meryl Williams, "The Transition in the Contribution of Living Aquatic Resources to Food Security," Food, Agriculture and the Environment Discussion Paper 13 (Washington, D.C.: International Food Policy Research Institute, 1996); Brian J. Rothschild, "How Bountiful Are Ocean Fisheries?" *Consequences*, vol. 2, no. 1 (Winter 1996).

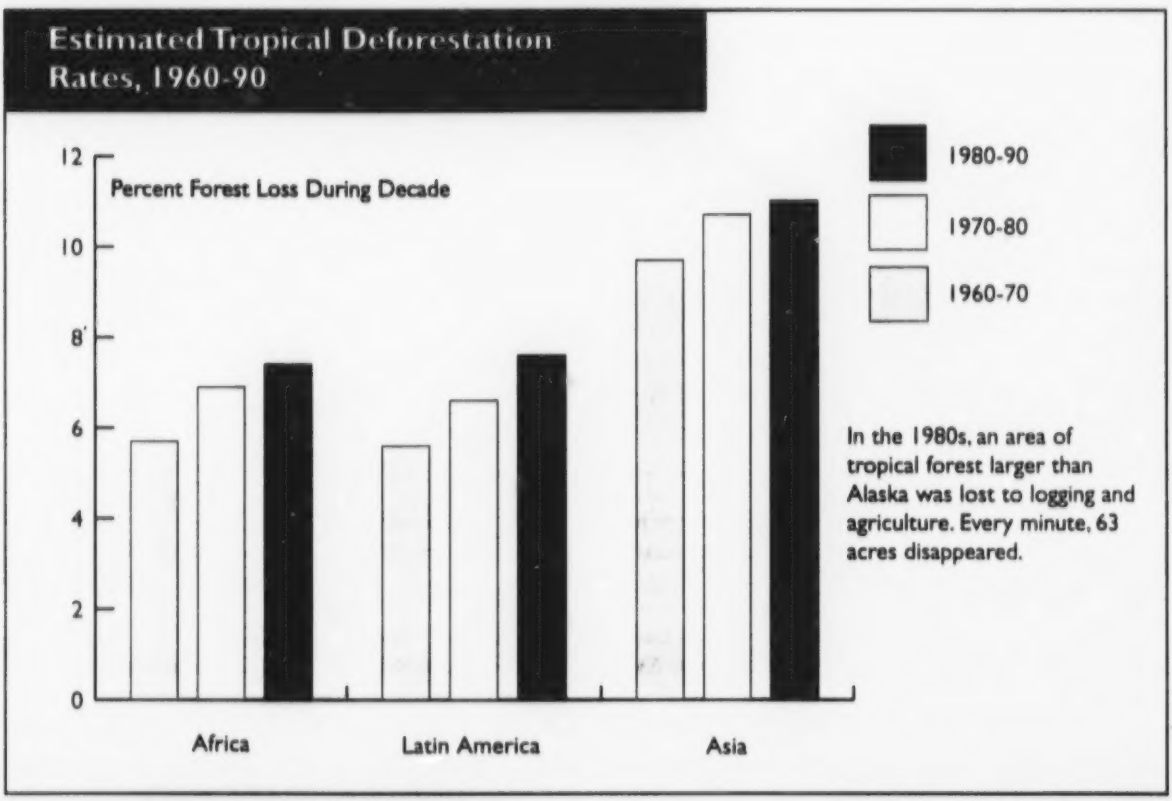
forests and trees

The world's forests are retreating rapidly in response to the expansion of human activities, driven in large part by population growth.

An estimated 59,500 square miles of tropical forest—nearly equivalent in size to the state of Florida—disappeared each year during the 1980s,[1] and the pace is probably similar in this decade.[2] The world's tropical forests have already lost anywhere from one-fifth to one-third of their original size.

Analysts have long argued about whether deforestation results more from landless farmers clearing trees for subsistence production or from the timber industry's logging for profit. Both activities relate to population growth, although logging for profit is also tightly linked as well to high levels of per capita wood consumption in wealthier countries. The balance of recent opinion is that farmland extension and fuelwood collection now contribute more than commercial logging to deforestation, and this proportion is probably increasing.[3] Some countries, such as Thailand and the Philippines, have restricted logging as their forested area has shrunk, but it is more difficult to balance the needs of forests with those of landless farmers.

The amount of forested land in wealthier countries is also responding to changes in consumption



Data: Food and Agriculture Organization

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patterns and in economic activity as well as in population size. In some areas of the eastern United States, for example, tree cover is returning to land that was once farmland but became unprofitable for agriculture decades ago. Rising demand for paper and wood products of all types nonetheless is contributing to the loss of forests in western North America and elsewhere. And air pollution—including acid rain, ozone smog and heavy metals—is also threatening the health of forests in North America and Europe.[4] As with other environmental trends, no single cause explains deforestation. Population growth increases the scale of a host of human activities that result almost inevitably in the loss of trees. While newly planted trees can replace those that disappear, reforestation is not remotely keeping up with the retreat of forests today, nor are regrown and managed forests likely to harbor the wealth of plant and animal species that natural forest ecosystems shelter. The pressure of further population growth is likely to challenge all countries with remaining tropical forest. About 60 percent of the population growth occurring in this decade is taking place in such countries, and an even higher percentage of the world's projected population will live in them by 2025.[5]

1. Forest Resources Assessment 1990 Project, Food and Agriculture Organization of the United Nations, "Second Interim Report on the State of Tropical Forests," paper presented at the 10th World Forestry Congress, Paris, September 1991 (rev. October 15, 1991) as cited in World Resources Institute, *World Resources 1992-93* (New York: Oxford University Press, 1992).

2. Diana Jean Schemo, "Amazon is Burning Again, as Furiously as Ever," *The New York Times*, 12 October 1995; Schemo, "Burning of Amazon Picks Up Pace, With Vast Areas Lost," *The New York Times*, 12 September 1996

3. Paul Harrison, *The Third Revolution: Population, Environment and a Sustainable World*, rev. ed. (London: Penguin, 1994).

4. William K. Stevens, "The Forest that Stopped Growing: Trail is Traced to Acid Rain," *The New York Times*, 16 April 1996; Jon R. Luoma, "Damage in Trees Tied to Heavy Metals in Air," *The New York Times*, 7 May 1996.

5. Norman Myers, "Tropical Deforestation: Rates and Patterns," in K. Brown and D.W. Pearce, eds., *The Causes of Tropical Deforestation* (London: University College Press, 1994).

coastal areas

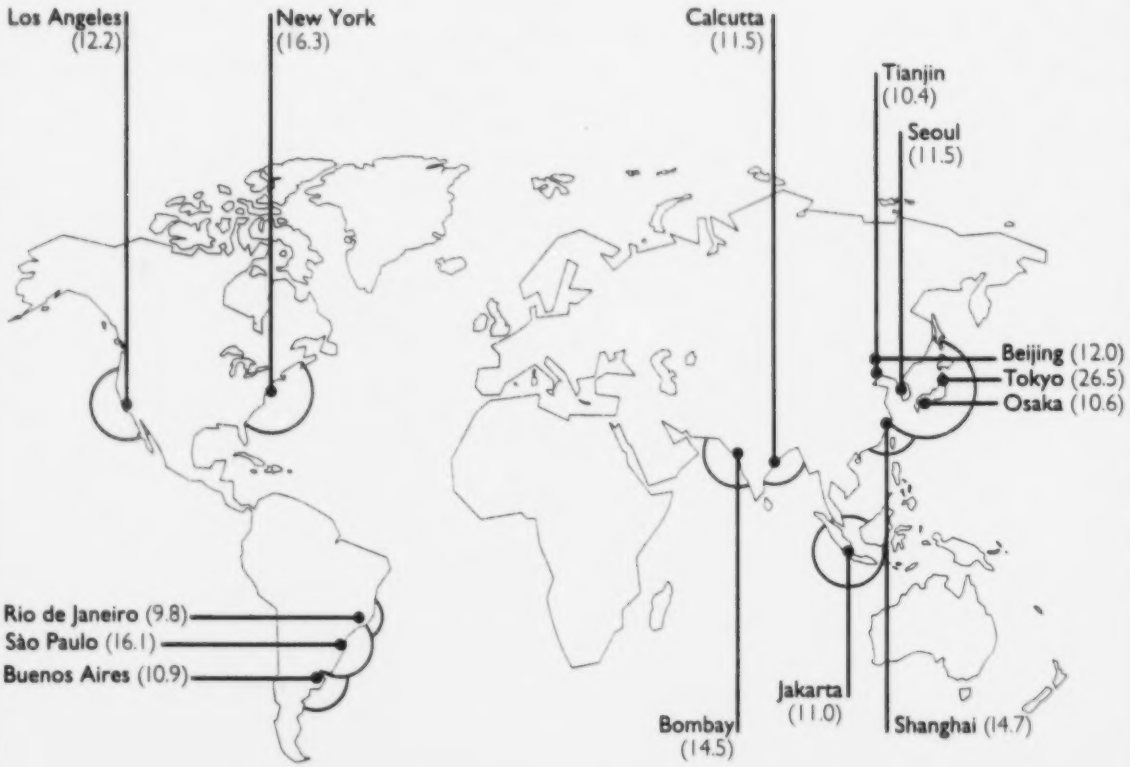
Much of the world's population growth is taking place along coasts, threatening wetlands, fish and other important natural resources that are abundant where the land meets the sea.

By some estimates, nearly two-thirds of the world's population lives within about 100 miles of an ocean, inland sea or major freshwater lake.[1] Fourteen of the world's 15 largest megacities—urban areas with populations of 10 million or more people—are coastal. And population projections suggest that the proportion of the world's people living on coasts will only increase, due to migration from inland areas as well as to high birth rates on the coasts themselves.

Coastal Megacities of the World

Note: Populations of megacities in millions.

Fourteen of the world's 15 largest urban agglomerations are on seacoasts. Some of their impacts include growing loads of sewage and other wastes, the drainage of wetlands, development of beaches, and the destruction of such prime fish nurseries as mangrove forests, sea grass beds and coral reefs.



Data: United Nations Population Division - 1994

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By one estimate, more than half of coastal ecosystems are at risk from growth, with the greatest stress in Europe and Asia.[2] The increasingly dense coastal concentrations of humanity use the fish-rich continental shelves for disposal of sewage and other wastes, drain wetlands and remove mangrove forests (which filter pollutants and serve as nurseries for aquatic and bird life), and damage sea grasses and coral reefs. As many as half the world's wetlands may already have been converted to farms, fish ponds and residential and resort communities. According to one estimate, less than a third of the planet's once extensive coral reefs remain in a stable or undegraded condition, and 10 percent are degraded "beyond recognition."[3]

Biologists believe the number of living species in coastal land and water is at least equal to and perhaps greater than that within tropical forests.[4] Since most of the world's fish are caught in coastal waters, rapid population growth along coasts also jeopardizes a major food source. Coastal pollution affects life planetwide as well. Researchers have discovered high levels of DDT, PCBs and other toxic compounds in the tissue of black-footed albatross on the remote Midway atoll in the middle of the Pacific Ocean.[5] As in so many population-environment relationships, everything is connected to everything else, and no place is far away.

1. Don Hinrichsen, *Living on the Edge: Coasts in Crisis* (Washington, D.C.: Island Press, forthcoming).

2. Dirk Bryant et al, "Coastlines at Risk: An Index of Potential Development-related Threats to Coastal Ecosystems," *WRI Indicator Brief* (Washington, D.C.: World Resources Institute, 1995).

3. Clive Wilkinson, Australian Institute of Marine Science, cited in Don Hinrichsen, "Coasts under Pressure," *People & the Planet*, vol. 3, no. 1 (1994).

4. Robert Engelman and Pamela LeRoy, *Catching the Limit: Population and the Decline of Fisheries* (Washington D.C.: Population Action International, 1995).

5. Les Line, "Old Nemesis, DDT, Reaches Remote Midway Albatross," *The New York Times*, 12 March 1996.

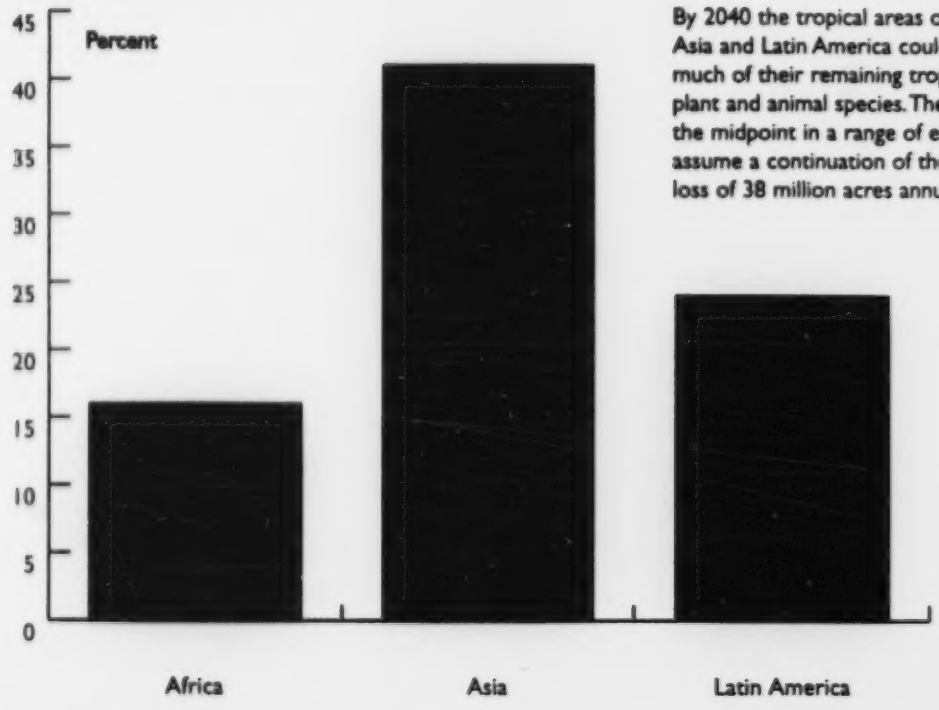
endangered species

Wild habitats that shelter endangered plant and animal species are giving way to human activities and needs.

By the estimate of one of the world's most respected conservation biologists, an average of 27,000 species may be disappearing each year.[1] This is thousands of times higher than the natural rate of species extinctions. Among the direct causes of this loss of other living beings—our only known companions in the universe—are deforestation and the ongoing destruction of wetlands and coastal habitat. These activities relate especially to the human tendency to convert wilderness into agricultural land, and agricultural land to residential, industrial, commercial and recreational use.

"The conversion of wilderness to agricultural land, or other forms of human use, is fundamentally linked to human population expansion and economic development," writes Princeton University biologist Andrew P. Dobson. "Obviously there are many subtleties in this process; nevertheless, it is hard to escape the basic fact that an increasing human population requires larger areas of cropland to provide food, as well as areas in which to live and process the resources that make human civilization viable."[2]

Predicted Percent Decline in Tropical Forest Plant and Animal Species, 1990-2040



By 2040 the tropical areas of Africa, Asia and Latin America could lose much of their remaining tropical forest plant and animal species. These figures, the midpoint in a range of estimates, assume a continuation of the current loss of 38 million acres annually.

Data: Andrew P. Dobson, Conservation and Biodiversity.

The issue is not merely the complete conversion of wild land for human use, but the increasing fragmentation of forests and other wild areas. Wild plant and animal populations need certain minimum uninterrupted land areas to survive and thrive. Often the patches of wilderness left intact are insufficient to sustain functioning ecosystems. Moreover, for every acre of forest land converted to working farm or pasture, another acre becomes too degraded either to contribute to food production or to maintain biologically diverse ecosystems.

While the global trend toward urban living tends to concentrate human population growth into already settled areas, urbanization poses its own threats to species and ecosystems. Pavement is the ultimate destroyer of wild habitat. The pollution caused by concentrations of humanity can affect distant habitats, especially in coastal areas. City dwellers depend on farms that can be half a globe away, while the supply networks for their food and other needs stretch across the planet.

Population growth, often combined with growth in per capita resource consumption, can be the critical factor pushing an ecosystem past natural levels of tolerance and resilience. In many ecosystems, extinction rates—including the future extinctions set in motion by today's environmental impacts—appear to accelerate from low levels as the last 20 to 30 percent of a habitat is destroyed.[3] This observation could help explain why extinction rates are spiking sharply upward as world population, which took until 1950 to reach 2.5 billion people, approaches 6 billion people in 1999.[4]

The extinction of each nonhuman species represents the destruction of something precious in and of itself, an unfathomable part of nature that once had its own independent existence. But the loss also affects human interests beyond the spiritual and esthetic. Our well-being depends, in ways we cannot fully understand, on the services the planet's millions of plant and animal species provide. An estimated 70 percent of the drugs on which modern medicine relies are derived from compounds found in nature. These came from only about 250 plant species (traditional medicine relies on several thousand species)[5], yet only one plant species in nine thousand has been examined for its medicinal properties. At the very moment in human history when we have the tools for studying and applying genetic information from nature, we are discarding forever much of the planet's genetic heritage.

One consequence of the destruction and fragmentation of forests and the growing use of pesticides on farms is the decline of bees and other pollinators. The danger here is more than the loss of the wonder that bees offer us or the threat to the world's supply of honey. The danger is that staple crops that require pollination to reproduce—and most do—could fail. By one estimate, one out of every three mouthfuls of food depends on pollination by insects and other animals.[6] Without bees and other pollinators, many people may be left without varied and inexpensive sources of food. Losing species, we lose more than we know.

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1. Edward O. Wilson, *The Diversity of Life* (Cambridge, Massachusetts: Harvard University Press, 1992).

2. Andrew P. Dobson, *Conservation and Biodiversity* (New York: Scientific American Press, 1996).

3. David Tilman, "Habitat Destruction and the Extinction Debt," *Nature* 371 (1 September 1994).

4. Lee Hannah et al., "A Preliminary Inventory of Human Disturbance of World Ecosystems," *Ambio*, vol. 23, nos. 4-5 (July 1994).

5. Jeffrey A. McNeely et al., *Conserving the World's Biological Diversity* (Gland, Switzerland: International Union for Conservation of Nature and Natural Resources, 1990).

6. Stephen L. Buchmann and Gary Paul Nabhan, *The Forgotten Pollinators* (Washington, D.C.: Island Press, 1996).

infectious disease

Disease knows no borders, and population growth is a factor in the recent upsurge of infectious disease.

By living and interacting in densely populated settlements, human beings make it easier for disease-causing microorganisms to jump from one host to the next. Crowding, migration and easy travel dramatically increase the opportunities for the spread of infection. A growing population size expands the pool of humanity that parasites and other organisms can exploit. Writing about the growing risk of infectious disease Joshua Lederberg, who won a Nobel prize for his work in genetics, identified the "preponderant changes" behind the increased risk as "the sheer expansion of our species, with high population densities, and much the worse, egregiously stratified by standards of economics, nutrition, housing, and public health."[1]

A 1996 report by the World Health Organization noted the hazards of new settlements in formerly uninhabited countryside—a phenomenon related to population growth—because the process can expose human beings to previously unknown disease organisms, such as

Global Reach of Hemorrhagic Fever Viruses

Hemorrhagic fevers, caused by several families of viruses, are often fatal. Symptoms include a general deterioration of health accompanied by superficial and internal bleeding. Among the better known hemorrhagic fevers are Ebola, Lassa, Hantavirus Sin Nombre, Rift Valley and dengue. Spread through contact between human beings and animals (often rodents), these infections are increasingly common in the United States and Europe as well as in developing countries. The major cause of the recent surge in outbreaks, experts report, is increasing deforestation and other ecological disruption related to the spread and intensification of human activities, leading to increased contact between human beings and animals. The map indicates the global reach of the viruses that cause these fevers.

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Source: Adapted with permission from illustration by Johnny Johnson in "Emerging Viruses" by Bernard Le Guenno, copyright © 1995 by Scientific American, Inc. All rights reserved.

the human immunodeficiency virus (HIV) and the Ebola virus.[2] The mounting use of antibiotics and other drugs for billions of episodes of disease each year contributes to the increasing microbial resistance to common drugs that is now hobbling disease control around the world. Even growth in the food supply, necessary to feed larger populations, can increase our vulnerability to disease. As Martin J. Blaser points out in an editorial in *The New England Journal of Medicine*, the potential for microbes to undergo their own population explosions is "implicit in large-scale food production," and because of this, "the opportunities for foodborne transmission of disease seem to be increasing."[3]

Although there has been little research on the direct links between population dynamics (size, growth and density) and disease outbreaks, some data suggest the likelihood of such links. A study of dengue hemorrhagic fever in Bangkok concludes that the mosquito that causes the debilitating tropical disease could establish itself only in urban areas that passed critical population thresholds. In Thailand between 1960 and 1972 there was a close correlation between the pace of urban population growth and reported cases of dengue.[4]

Added to the problems of population density and mobility are other factors related to population growth: People who are malnourished or lack safe sources of water and sanitation are vulnerable to illness. Global warming threatens to expand the range of tropical insects and other organisms that can spread disease. The increasing pressure to achieve high crop yields through pesticide use adds to the dangers of human exposure. Some of these chemicals are persistent organic pollutants now suspected of having long-term impacts on the reproductive systems of humans and animals. Because international trade carries foods around the world, while wind and water carry pesticide byproducts across borders, no one on the planet is beyond the reach of chemicals used legally or illegally in any country.

At the country and community level, governments often lack the resources or the will to keep sanitation and public health services growing as fast as population. At the household level, evidence from demographic surveys suggests that children born after several siblings tend to receive fewer immunizations and less medical attention for fevers and other illnesses than first born or second born children.[5] The cumulative effect of all these influences is a greater risk of disease with higher birth rates and rapid population growth.

1. Joshua Lederberg, "Infection Emergent," *Journal of the American Medical Association*, vol. 275, no. 3 (17 January 1996).

2. World Health Organization, *World Health Report 1996* (Geneva: World Health Organization, 1996).

3. Martin J. Blaser, "How Safe is our Food: Lessons from an Outbreak of Salmonellosis," *The New England Journal of Medicine*, vol. 334, no. 20 (16 May 1996).

4. Hella Wellmer, "Some Reflections on the Ecology of Dengue Haemorrhagic Fever in Thailand," in Neil D. McGlashan and John R. Blunden, eds., *Geographical Aspects of Health* (London: Academic Press, 1983).

5. Mark R. Montgomery and Cynthia B. Lloyd, "Fertility and Maternal and Child Health," Dennis A. Ahlburg et al., eds., *The Impact of Population Growth on Well-being in Developing Countries*" (Berlin: Springer, 1996).

population, government and conflict

Growing scarcities of critical natural resources may contribute to civil conflict in some countries.

Since the end of the Cold War, a major concern for the United States has been the problems caused when states "fail"—that is, when governments fall apart or become incapable of maintaining peace within their own borders. In recent years, U.S. troops have been dispatched to Somalia and Haiti to help restore order in these countries, and Americans have witnessed mass killings in Rwanda and random violence on the streets of Monrovia, the capital city of Liberia. Each of these civil conflicts has produced streams of refugees into neighboring countries.

What are the roots of these conflicts, and why are so many occurring today? No single cause or theory can fully explain why societies fall into disorder, and it is unrealistic to expect human behavior to follow predictable laws as physical systems do. A group of researchers led by University of Toronto political scientist Thomas Homer-Dixon hypothe-

Humanitarian Emergencies

Average Annual Rate of Population Growth (%) 1990-1995*	Country	Persons at Risk	% of Total Population at Risk
5.8 %	Afghanistan	4 million	19 %
3.7	Angola	2.5 million	25
1.4	Armenia	350,000	10
1.2	Azerbaijan	950,000	12
-4.4	Bosnia & Herzegovina	3.7 million	90
3.0	Burundi	800,000	13
3.0	Cambodia	300,000	3
-0.1	Croatia	50,000	10
2.7	Eritrea	1 million	28
3.0	Ethiopia	3-4 million	5-7
0.1	Georgia	1 million	17
2.0	Haiti	900,000-1.3 million	14-20
2.5	Iraq	1.3-4.0 million	6-19
3.3	Liberia	1.5 million	49
2.4	Mozambique	400,000	2
1.9	North Korea	N/A	N/A
N/A	Russia (Chechnya)	300,000	27
2.6	Rwanda	2.5 million	29
2.4	Sierra Leone	1.8 million	38
1.3	Somalia	1 million	14
1.3	Sri Lanka	850,000	5
2.7	Sudan	4 million	13
2.9	Tajikistan	1 million	16

*Includes net migration.

Data: United Nations

sizes that one frequent characteristic of societies vulnerable to internal conflict is scarcities of such critical natural resources as fresh water, farmland, forests and fisheries. As people compete for access to these resources, some gain more than their share while others become increasingly marginalized.

Misunderstanding the complex interplay of factors involved in such conflicts, those affected may blame historic or traditional enemies in other ethnic groups. Governments face escalating demands to mediate the resulting tensions. Decisive action may be hampered by a shrinking tax base, perhaps because the dominant (usually wealthier) factions have influenced tax policy to their benefit. At some point, the pressure on weak and resource-poor governments becomes too much and they collapse.

Homer-Dixon and his colleagues contend that the growth of population contributes to the underlying environmental scarcities in at least three important ways: through subdivision, depletion, and degradation of the resource base. As greater numbers of people divide a fixed pie of fresh water or cropland, for example, the amount available to each person shrinks. To the extent the resource is renewable, its total size may remain the same, but less is still available to each person. To the extent the resource is nonrenewable—and even water and land can become nonrenewable resources when they are used beyond critical thresholds of renewability—the same process can cause resource depletion or degradation. In any combination of the three impacts, natural resources become less available as the number of people needing them increases. The same set of impacts can result as well from increases in per capita consumption by even a stable population. Most frequently, population and consumption dynamics interact to increase the use of natural resources more rapidly together than either force would by itself. Especially in the presence of other key ingredients—a history of ethnic strife, inequitable divisions of power and wealth, an ongoing economic crisis, for example—this process can set the stage for acute conflict.[1]

This explanation may fit most closely the circumstances of many developing countries, which are more likely than wealthier countries to feel the impacts of environmental scarcity and less likely to compensate for resource scarcities through trade or substitution. Elements of the theory, however, may apply to wealthier countries as well. Population growth increases the demands for the kinds of services that all governments must provide. The more rapid the growth in numbers of people, in general, the greater the growth in demand. The need to expand basic infrastructure—roads, water supply, sewers, hospitals and schools, for example—becomes especially acute. When the number of dependent children is high relative to that of working adults, these demands can become excessive in relation to the revenues governments derive from taxes.

The crowding that accompanies population growth inevitably multiplies the rate of basic human interactions. To maintain order societies require some degree of regulation or other forms of mediation. In the words of Fred Charles Iklé, Undersecretary of Defense in the Reagan administration, "More often than not, higher densities will lead to more government. More crowding means more people will bump into one another; and to mitigate these bumps, people nowadays demand that the government interfere even more. . . An unintended consequence of [population] growth will be more government."[2] Where governments are neither resourceful nor effective, however, the tendency may be not toward bigger government but simply toward governmental breakdown.

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1. Thomas Homer-Dixon and Valerie Percival, *Environmental Scarcity and Violent Conflict: Briefing Book* (Washington, D.C.: American Association for the Advancement of Science, 1996); Thomas Homer-Dixon, *Population and Conflict* (Liege, Belgium: International Union for the Scientific Study of Population, 1994); Thomas Homer-Dixon et al., "Meeting of the Project on Environmental Scarcity, State Capacity, and Civil Violence," summary of meeting at American Academy of Arts and Sciences, 2 October 1995.

2. Fred Charles Iklé, "Growth Without End, Amen?" *National Review* (7 March 1994).

buying time

Unceasing population growth, especially rapid growth, can accelerate the evolution of problems relating to the environment, economic development, national and community security, and individual well-being.

Population growth tends to shorten the time and reduces the options available for citizens and their governments to address social, economic and environmental problems, and it raises the risk that otherwise manageable challenges will turn into crises and disasters. When policymakers struggle to resolve increasingly complex social, economic and environmental problems, their proposals rarely attract the consensus and public support needed for implementation. By themselves, neither slower population growth nor an end to that growth would solve these problems. Either, however, would offer societies more time to search for solutions.

The Likelihood of Surprises

Even if a particular environmental trend seems unthreatening or manageable today, we should not rule out sudden and dramatic changes that occur as population-related pressures exceed critical natural thresholds. A simple example of such a natural threshold is the freezing point of water, which stays in liquid form as the air gets colder until it reaches 32 degrees Fahrenheit—and city streets that once were merely wet become sheets of hazardous ice. On farmland a threshold may emerge when farmers find their crops no longer grow well because, after years of seemingly harmless soil erosion, root growth is constrained by bedrock a foot beneath the soil surface. Such "threshold effects" could create havoc in areas related to climate, food or water supply, or infectious disease.

Our knowledge about the interactions of human beings and the physical and biological worlds is incomplete. Only rarely can we predict the existence or location of natural thresholds before we cross them, and we may fully understand them only in retrospect. Even if in today's world the impacts of past population growth are less obvious, the past may be a poor guide to the impacts of population growth in the future. The population momentum inherent in today's population structure means that even if the world's current population posed no serious risk to the environment, future population growth—and hence greater risk—is all but certain.

global habitability

Population growth at current rates challenges the planet's long-term habitability.

While human beings are resourceful, it would be foolhardy to gamble the future of clean water supply, secure food sources, and decent health and housing on faith that science and technology will inevitably solve all these problems. Technical solutions offer only theoretical promise in the poorest countries where population pressures are most acute, education levels lowest and governments least effective. As Thomas Homer-Dixon has argued, the capacity to adapt and innovate is a human resource that societies and their governments must work to cultivate. Those most overwhelmed by rapid demographic growth and environmental deterioration tend to be least able to invest in education and otherwise adapt to accelerating change.[1]

Cumulatively, the environmental evidence suggests it will be at best extremely challenging to develop and employ technologies capable of supporting 10 billion human beings on the earth's finite supplies of renewable fresh water and arable land. Many policymakers and journalists accept as an authoritative forecast the idea that world population will double by the middle of the next century. This, however, is merely a projection of current trends based on assumptions about birth and death rates that may or may not prove valid as conditions change. As scientist Joel E. Cohen has suggested, population is now moving into a range where many past analyses have predicted limits to further growth. In much of the world, potential constraints are already evident in the availability of renewable water, cropland, fisheries and forests.[2] The worst possible outcome, a slowing of population growth due to rising death rates, remains a possibility.

population stabilization

Slowing population growth brings societies closer to population stability, a prerequisite for true natural resource sustainability—and ultimately, perhaps, a prerequisite for the economic and social underpinnings of human well-being.

Far too little is known about the relationships among population dynamics, a sound environment and well-functioning human societies to make blanket statements about "overpopulation," "optimum population" or "maximum carrying capacity." Yet to dismiss the importance of population policies in any specific issue area because of their weak impact in the short-term obscures a fundamental point: Population growth cannot continue indefinitely on a finite planet. Policy initiatives that result in lower birth rates bring societies closer to the day when population growth no longer acts as a complicating force in human life.

the accumulation of reasons

No single argument can do justice to the importance of slowing world population growth by expanding access to family planning and other reproductive health services and to educational and economic opportunities for women.

Imagine how much better off the world would be today if population had stabilized and universal access to these services and opportunities had been achieved 25 years ago. We cannot turn back the clock, but we can spare our children even sharper regrets about opportunities missed. We have the knowledge and the resources to address these problems today. In another 30 years, they may outstrip human ingenuity.

1. Thomas Homer-Dixon, "The Ingenuity Gap: Can Poor Countries Adapt to Resource Scarcity?" *Population and Development Review*, vol. 21, no. 3 (September 1995).

2. Joel E. Cohen, *How Many People Can the Earth Support?* (New York: W.W. Norton, 1995).

THE U.S. POPULATION ASSISTANCE PROGRAM

The United States is the recognized world leader in the population field and, through its foreign aid program, remains the single largest contributor of funds to population and family planning activities among industrialized countries. The principal objectives of U.S. involvement in global population programs are to enable couples and individuals to decide freely and responsibly the number and spacing of their children, to improve individual health (particularly the health of women and children), and to reduce population growth rates to levels consistent with sustainable development.

Tens of millions of couples use voluntary family planning services as a direct result of U.S. population assistance. Millions more have adopted family planning due to U.S. government support for a broad range of technical assistance, training, information, communication, policy, and research activities in developing countries. In the 28 largest recipient countries of U.S. funds, the average number of children per family has dropped from 6.1 in the 1960s to 4.2 today, a decline of nearly one-third.

The U.S. government provides its population assistance through three channels: bilateral, nongovernmental, and multilateral. One-third to one-half of the funds are provided directly to the governments of about 40 developing countries for projects jointly managed by the field missions of the U.S. Agency for International Development (USAID), which administers the U.S. foreign aid program. The remainder of USAID funds support a wide range of population activities in over 100 countries implemented by private, nongovernmental organizations (NGOs). The U.S. has also been a major contributor to the United Nations Population Fund (UNFPA), the largest multilateral organization involved in population, since its founding in 1969.

Virtually every major innovation in the population and family planning field can be directly or indirectly linked to U.S. support. For example, the United States has pioneered a variety of successful approaches to extending family planning through the private sector. Modern technology has also been creatively applied to the population field in the areas of mass communication, demographic data collection and analysis, and biomedical research in the development of new contraceptives.

The dedicated staff of career experts on population and related areas within USAID is unique among donor agencies. In addition, a strong public-private partnership with U.S.-based NGOs has been key to the USAID's ability to provide high quality technical advice and support to governments and indigenous NGOs in developing countries. Compared to other donors, USAID's substantial in-country presence has also been an important strength of U.S. population and development assistance.

The U.S. population assistance program was initiated in 1965. During the 1960s and 1970s, the U.S. population program enjoyed a significant level of bipartisan support under presidents of both political parties. A strong con-

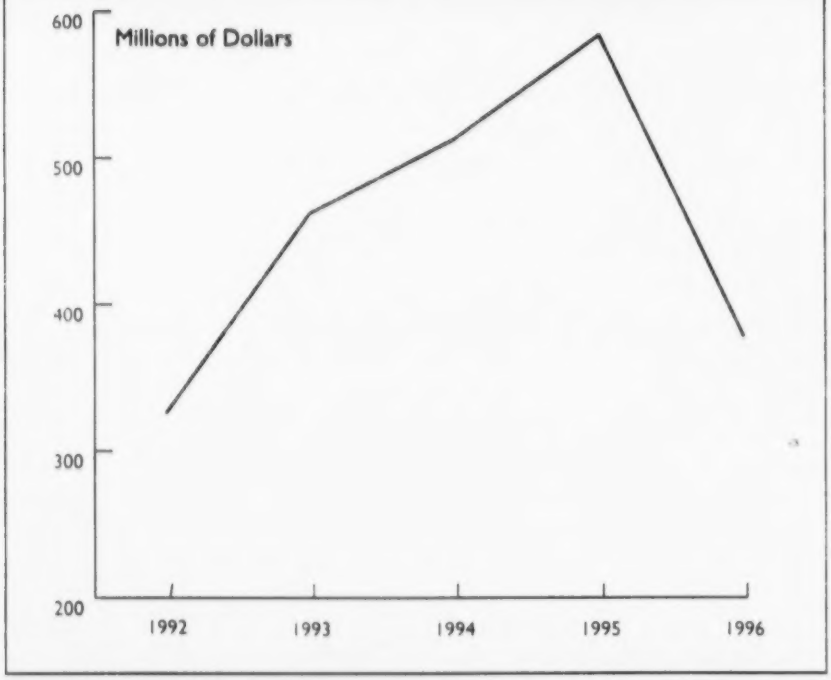
sensus existed that rapid population growth was one of the world's most serious problems, undermining the prospects for economic and social progress in developing countries and posing a long-term threat to U.S. national interests in the areas of trade, security, environment, and international migration. Domestic political considerations, however, led the Reagan and Bush Administrations to directly challenge this consensus.

In the 1980s, domestic political debates on abortion spilled over into international population assistance policy. The use of foreign aid funds for abortion or for coercive programs has been prohibited by law since the passage of the Helms amendment in 1973, and support for biomedical research on abortion was banned in 1981. But the Reagan Administration imposed additional policy restrictions on the program in 1984 with the announcement of the "Mexico City Policy," which denied U.S. assistance to a foreign NGO if it had any involvement in abortion, even if paid for with non-U.S. funds. In addition, the Reagan and Bush Administrations withheld the U.S. contribution to UNFPA between 1986 and 1992 because of its projects in China.

In 1993, the Mexico City Policy was overturned by a newly inaugurated President Clinton. The U.S. contribution to UNFPA was restored after existing law was reinterpreted by the Clinton Administration and after Congress approved safeguards disassociating the U.S. from any coercive practices and ensuring that no U.S. funds would be used by UNFPA in China. During the 104th Congress, anti-choice opponents of family planning have sought repeatedly to reimpose the Mexico City Policy and to cut off U.S. funding of UNFPA.

Congress first appropriated funds for population assistance in 1965. Funding rose fairly steadily to a peak of nearly $600 million in 1995 before suffering a drastic 35 percent funding reduction in 1996. But even before this congressionally-imposed funding cut, the effects of inflation and increases in the number of women of reproductive age have meant that the growth in U.S. funding for family planning and other reproductive health programs has failed to keep pace with the demand for high quality services around the world.

Funds Approved for Population Assistance by Congress, 1992-1996



Source: Population Action International

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TODAY'S CHOICES, TOMORROW'S POPULATION

The rate of world population growth is already declining, but the number of people could still double or even triple from today's 5.8 billion before stabilizing a century or more from now. Women in most countries are still having more than the two-child average consistent with a stable population size. Moreover, so many young people are now entering or moving through their childbearing years that even a two-child average per couple would still boost population size for a few decades until the momentum of past growth subsides. Yet there is reason for optimism. The combination of access to family planning and other reproductive health services, education for girls and economic opportunity for women could lower birth rates enough to stabilize world population well before a doubling of today's total.

Among the most important needs is universal access to the information and means to plan families.

At the 1994 International Conference on Population and Development in Cairo, 180 nations reached a historic consensus on both the need and the means to slow population growth and eventually stabilize human numbers. The strategy is grounded in the recognition that couples have the right to make their own decisions about childbearing. Among the most important needs is universal access to the information and means to plan families. The availability of a variety of contraceptive options helps women plan their families and avoid the health risks of unwanted pregnancies. Child spacing also makes it more likely that children will survive their births and early years. In the long-term, access to contraception helps reduce reliance on abortion, to which many women without access to effective contraception turn.

Both the ongoing decline in desired family size and the annual addition of 24 million more women in their childbearing years argue for dramatic expansion of international family planning and related health services in the coming years. Sharing U.S. expertise in contraception and family planning service delivery is consistent with our history, our culture and our ideals. American innovations in aviation, automobiles, televisions and computers are rapidly transforming the developing world, for good or ill. American expertise in public health, medicine and in providing clean water helped produce the unprecedented worldwide declines in death rates after World War II, the decisive factor in post-war population growth. Finally, the United States increasingly is exporting its culture to poorer countries in the form of popular entertainment and advertising. We have an obligation to share as well our technological advantages in contraception and reproductive health care. These are not affordable by most couples in developing countries without help from governments—their own and ours.

International family planning assistance represents a success story of historic proportions, and the United States deserves credit as a long-time leader in this field. In the 30 years since the U.S. government began helping other countries provide their citizens with family planning services, the number of couples using contraception in developing countries has multiplied tenfold and the average number of children per woman has declined from nearly six to fewer than four. Population growth has slowed impressively, and it continues to slow. The U.S. contribution to this success story has cost less than 4 cents out of every $100 raised in taxes.

We can also help slow population growth by helping other countries improve the lives of women and girls in ways that go beyond providing access to family planning and related reproductive health care. Greater access to schooling for girls and young women—especially beyond the early grades—leads to lower birth rates in almost all countries and cultures. Access to secondary school education correlates with later marriage, knowledge and use of contraception and small family size. Secondary schooling also increases the likelihood that women will take paying jobs or launch small businesses and otherwise contribute more to their families, to their communities and to national economies. In addition, education for girls and women improves the survival rates of mothers and children, as parents' knowledge about preventive care is one of the most important contributors to family health.

In Peru, a woman who has completed 10 years of education typically has two or three children. A woman who has never seen a classroom has seven or eight. In 23 developing nations, the average woman with a secondary school education has her first child three and a half years later in life than a woman with no schooling. Like smaller families, such delays in first births exert a powerful brake on population momentum by lengthening the time span between generations.[1] Average family size and child death rates are lowest in countries such as South Korea and Sri Lanka that combine high levels of education for women with strong family planning and health programs.[2]

Providing opportunities for women to gain income for their work enhances women's status and well-being, and early evidence suggests that this, too, may encourage the use of family planning and thus contribute to slower population growth.[3] Banks in Asia and Latin America that target small loans for women's enterprises find that women taking advantage of such programs tend to have fewer children on average. (They also have much better repayment rates than men.) The World Bank, known more for the large development projects it helps sponsor than for its social spending, recently announced that it will lead a drive to raise $200 million to provide small-scale loans to help low income people start their own businesses, in part because the impacts of such loans on women's lives appears to be so positive.[4]

International family planning assistance represents a success story of historic proportions.

Family planning and related health services, education for girls and economic opportunity for women all work best when they work together, and each strategy deserves attention and financial resources. The U.S. contribution has been historically strongest in areas related to family planning delivery. We need to continue and strengthen that contribution, and we need to expand it to encourage better access to reproductive health, education and economic opportunities for girls and women worldwide.

Family planning and related health services, education for girls, and economic opportunity for women all work best when they work together.

A FINAL WORD

Population matters—to those who want their children to live long and healthy lives, to those who value a clean and secure environment, to those who want to help others take responsibility for their own lives, to those who ask that jobs be available for all, and to those who work for a more peaceful world. Slowing world population growth is important to all Americans. The 30-year U.S. effort to make contraception and related health and education services available worldwide is a success story. Today that success is threatened as never before by misunderstanding and misinformation. By informing yourself and communicating your views to legislators, the White House and the news media, you can make a difference.

1. T. P. Schultz, *Return to Women's Education*, in E. King and A. Hill, *Women's Education in Developing Countries: Barriers, Benefits, and Policies* (Baltimore, Maryland: Johns Hopkins University Press, 1991).

2. Shanti Conly, *Closing the Gender Gap: Educating Girls* (Washington, D.C.: Population Action International, 1993).

3. Sidney Ruth Schuler and Syed M. Hashemi, "Credit Programs, Women's Empowerment, and Contraceptive Use in Rural Bangladesh," *Studies in Family Planning*, vol. 25, no. 2 (March-April 1994); Sidney R. Schuler, "Empowerment and Family Planning in Bangladesh," *Network*, vol. 15, no. 1 (August 1994).

4. Christopher S. Wren, "World Bank Plans Small Loans to Poor," *The New York Times*, 17 July 1995.

what **YOU** can do...

Among the most effective means for citizens to influence the debate on international population assistance is to write their members of Congress. Letters to members of the committees that consider population-related legislation are especially valuable because most legislation that committees approve is eventually passed by Congress and signed into law. Letters educate not only senators and representatives but their staffers, who actually read the correspondence and craft most responses for the members' signatures. Congressional offices receive relatively little mail regarding international population and other development issues, so letters on these topics can be especially influential.

The best letters to members of Congress are brief, concise and limited to a single issue, even a single basic point. Support your point with well documented facts. Ask about the legislator's position and ask her or him to describe it for you.

Ask for a pledge of support for or against specific legislation, using the formal name or legislative number of the bill. Be positive and constructive. It's important to use personal or business stationery with a return address included. Note whether you are a constituent.

Address your letter as follows:

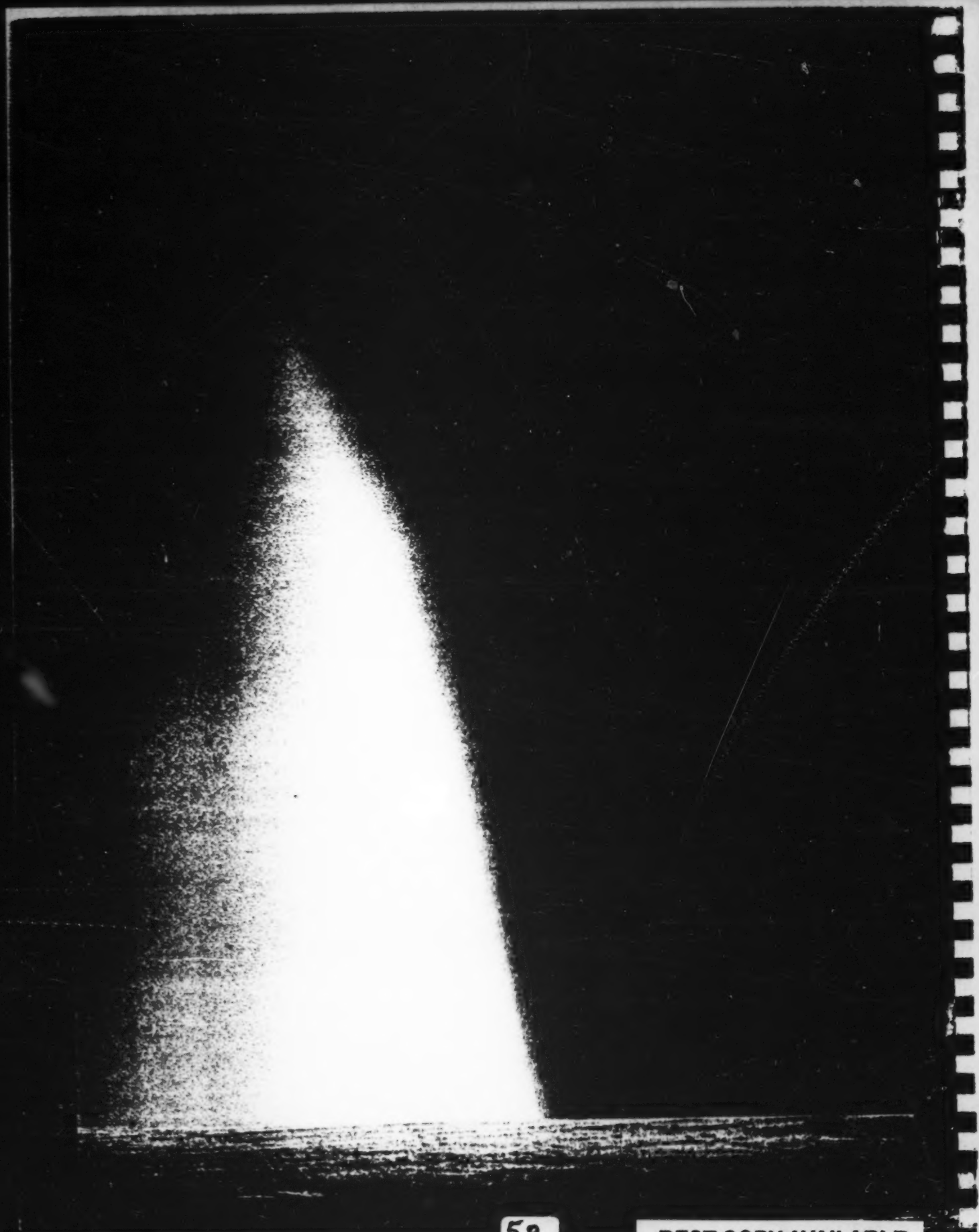
For Senators:
The Honorable _____
United States Senate
Washington, D.C. 20510

For Representatives:
The Honorable _____
House of Representatives
Washington, D.C. 20515

To telephone the office of your senator or representative, call the U.S. Capitol at 202-224-3121. Senators and representatives have state and district offices in larger cities, and the addresses and telephone numbers of these offices are in local phone directories.

To view information on the World Wide Web for your senators and representatives use: http//www.house.gov and http//www.senate.gov. Email addresses, if available, are listed on those web sites. For more information, also see the party sites: http//www.democrats.org and http//www.rnc.org.

In addition, writing letters on international population assistance policy to local newspapers can have a significant impact on congressional representatives and their staffs, who closely follow the local and national news media.



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